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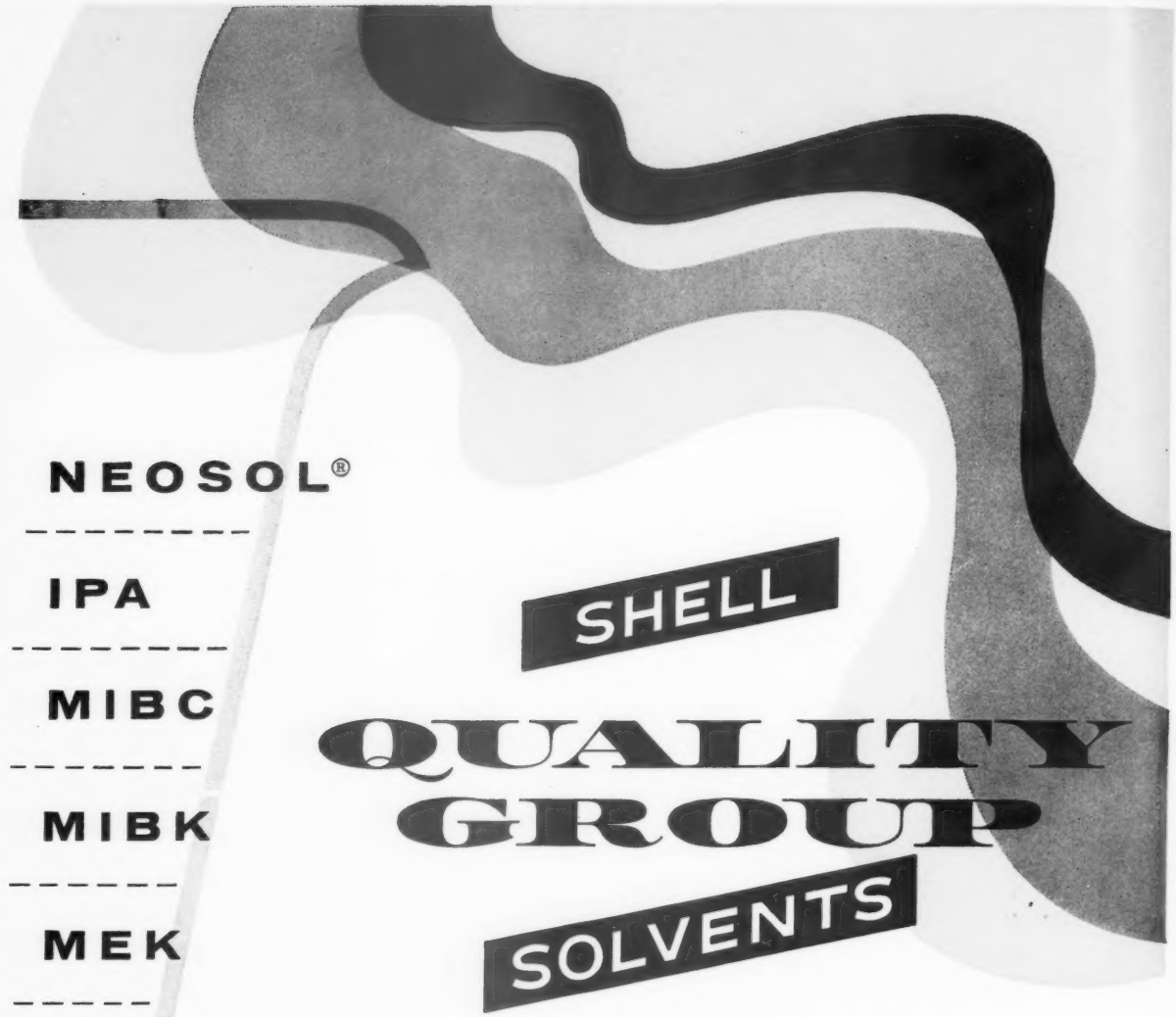

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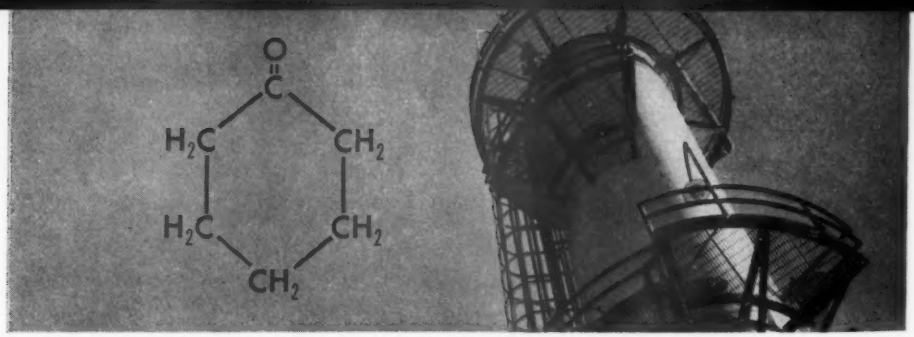

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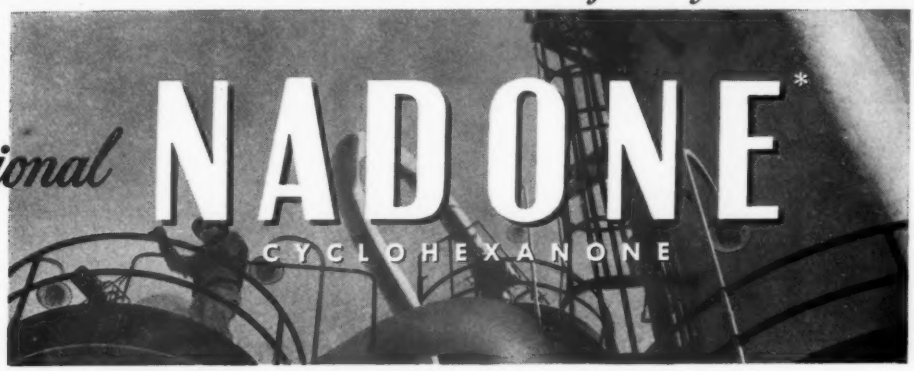

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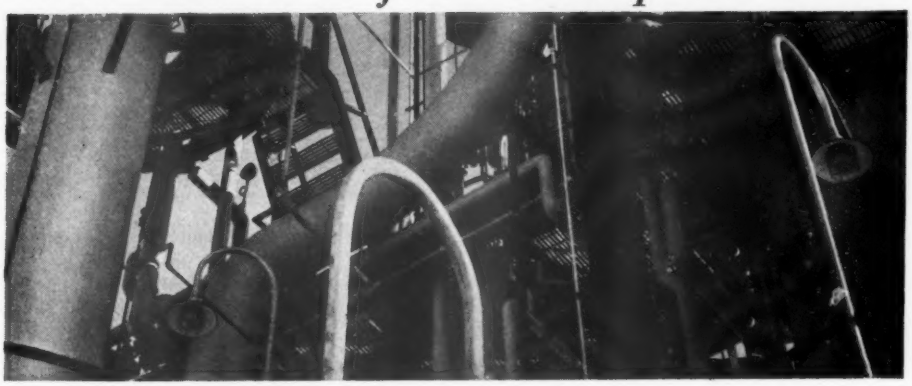

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(Established in 1910 as The Paint and Varnish Record)

VOL. 46 MARCH, 1956 NO. 4

PLEASE NOTE!

This March Issue has been designated as Number 4 of Volume 46 due to the fact that in February we publish two issues; the regular February issue designated as Number 2 of Volume 46 and the Review of the Paint Industry issue designated as Number 3 of Volume 46.

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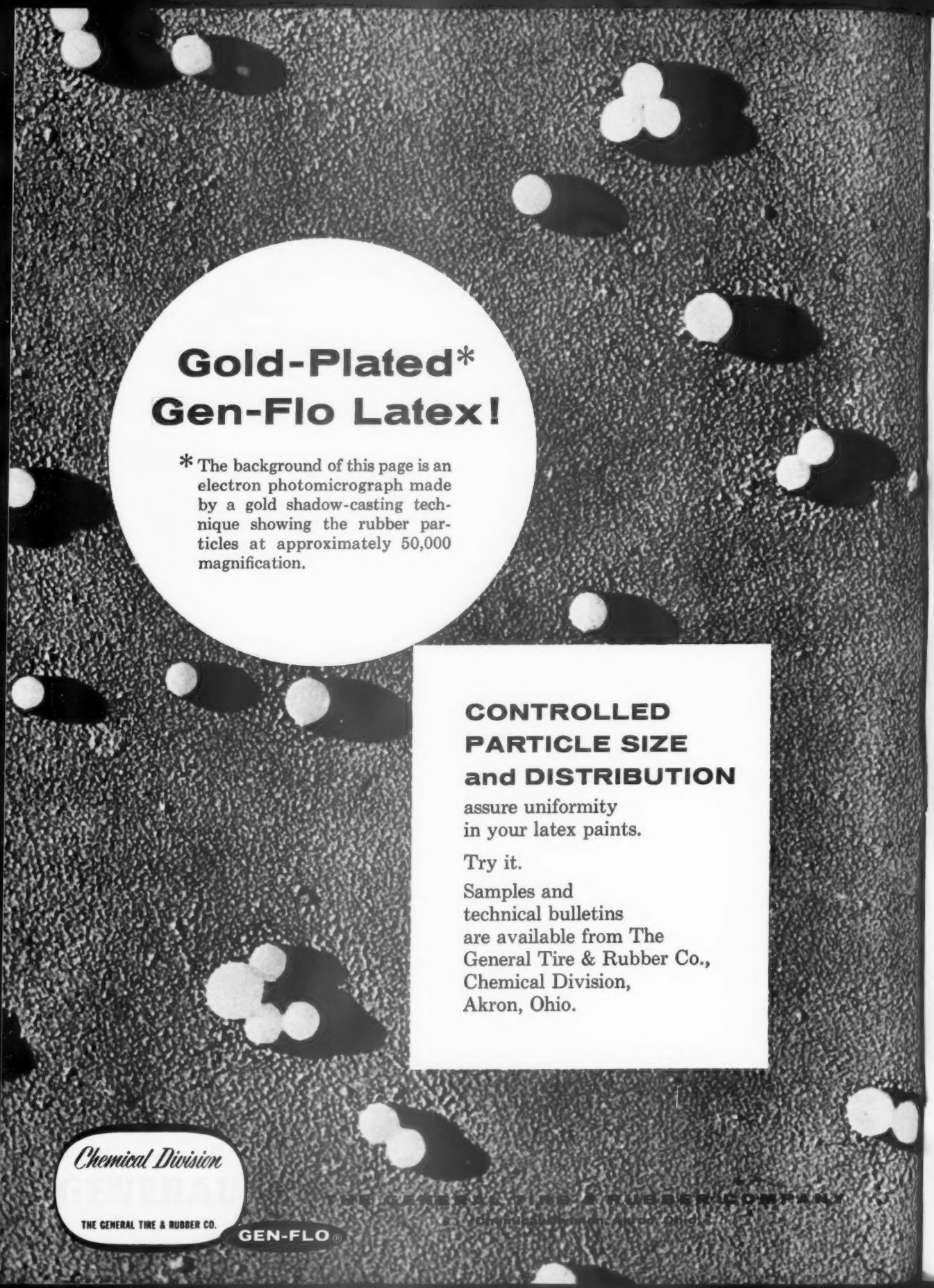
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Editorial Comment

March, 1956

Planned Obsolescence

PLANNED obsolescence is the process of "improving our business by deliberately making obsolete the things we make or use, our processes and techniques and our industrial know-how," according to William C. Stolk, president of the American Can Company.

In a talk before the recent dinner of the Purchasing Agents Association of New York and the Sales Executives Club of New York, Mr. Stolk said that planned obsolescence is "one of the most powerful driving forces in modern business" and the prime ingredient in our growth and development.

Citing the container industry as example, Mr. Stolk explained that some time ago it was decided to obsolete the tin can before any one of several factors might combine to obsolete it—specifically the strategic nature of the world's tin supplies.

Mr. Stolk further stated research is turning up new materials and production methods that are making possible cans for many products never before packaged in metal containers.

"We have gained so much momentum that I don't hesitate to predict that the metal cans of five years from now will be unrecognizable by todays' standards," he said. "More than that, the cans of tomorrow will be better and more economical, and far more products will be packed in them than ever before."

Mr. Stolk also foresaw the possibility that entirely different production methods, such as welding and the use of plastic cements and synthetic resin coatings, eventually may reduce the amount of machinery and the size of can factories as much as one half.

On the basis of Mr. Stolk's statement, it is indeed good to know that synthetic resin coatings are playing an important part in the planned obsolescence program of the container industry.

Accent on Color

THE subject of color coordination was given top billing at the recent convention of the Painting and Decorating Contractors of America in Washington, D. C. Experts in the decoration and designing fields discussed color coordination, illustrating them in a series of eight palettes. Each of these palettes included fabrics, floor coverings and wall finishes in a visual demonstration of coordinated color schemes.

This is one of the many examples demonstrating the theory that color is a powerful sales force.

In this day and age when color is playing such a dynamic part in our daily lives, it is imperative that industrial designers devote considerable attention to color styling as an important factor in the saleability of their products.

Besides its aesthetic value, color has many practical applications. For example, in maintenance painting color promotes good visibility, increases safety and efficiency, facilitates manufacturing operations and identification, improves cleanliness, etc. More recently, it was brought to our attention that a slide rule manufacturer is selling a yellow one on the theory that yellow blocks other reflected colors in the spectrum, making it easier to read the scales.

With today's accent on color, color manufacturers, in addition to producing a variety of toners and shades to meet the consumer's fancy, must also consider color deterioration in various applications. In the case of the coatings industry, it is a joint effort of both the paint and pigment technologist to insure that in coating applications color will stand up against heat, light, dirt, detergents, abrasives, handling, etc. Thus, as color is used in more and more applications, the problems of color deterioration must be duly considered and solved, and, in many instances, it may mean the evolution of new types of pigments.

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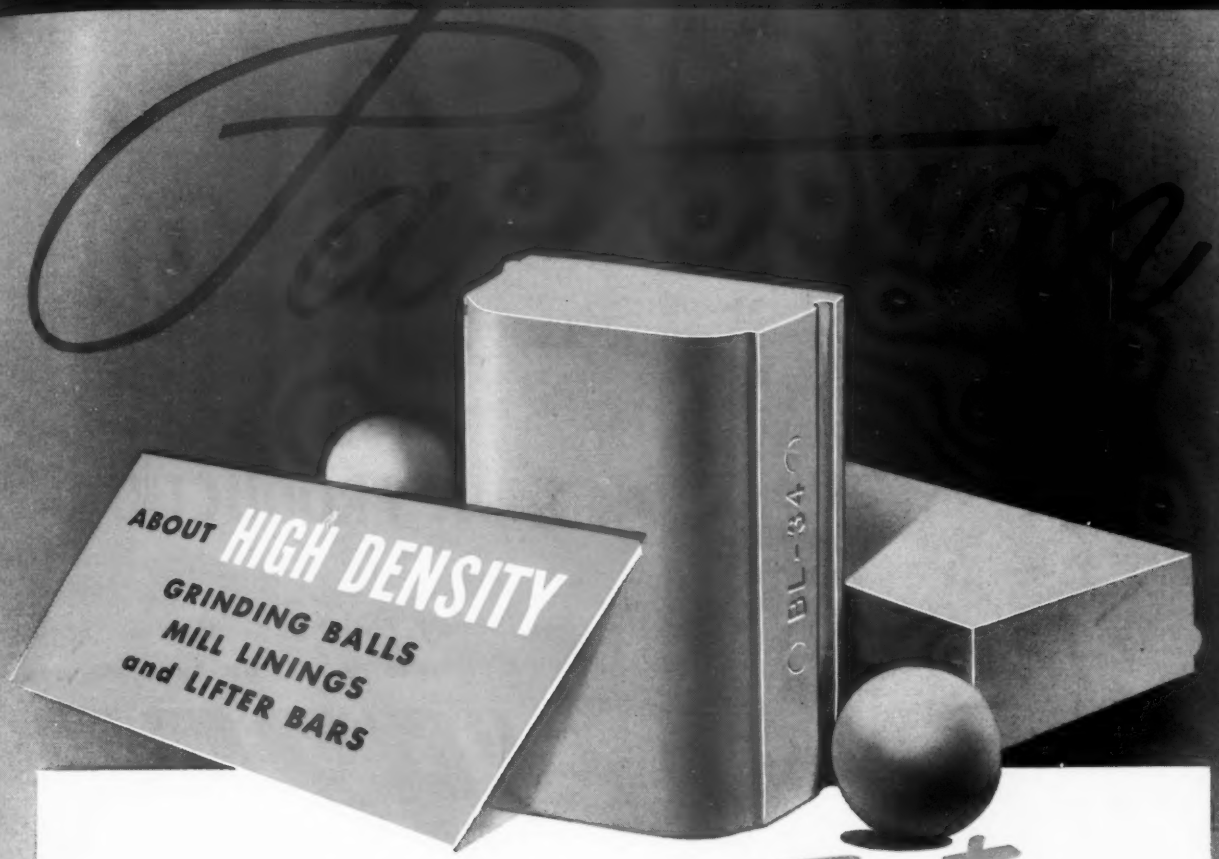

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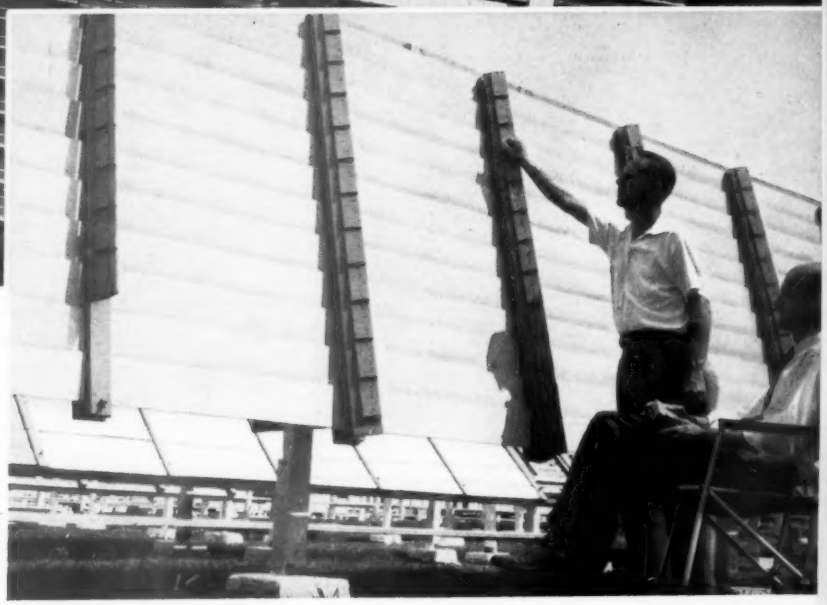

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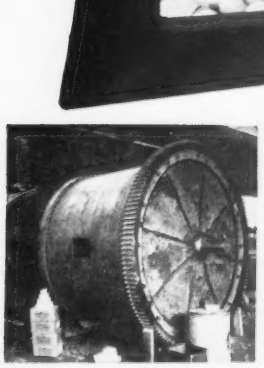

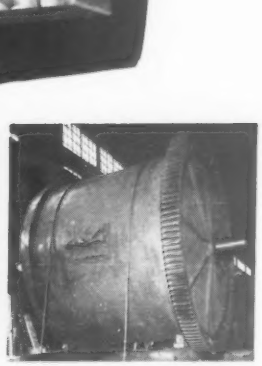

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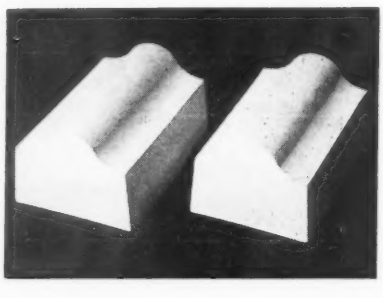

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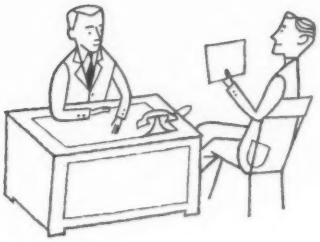
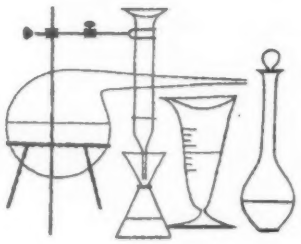
to  talk about

solvents 

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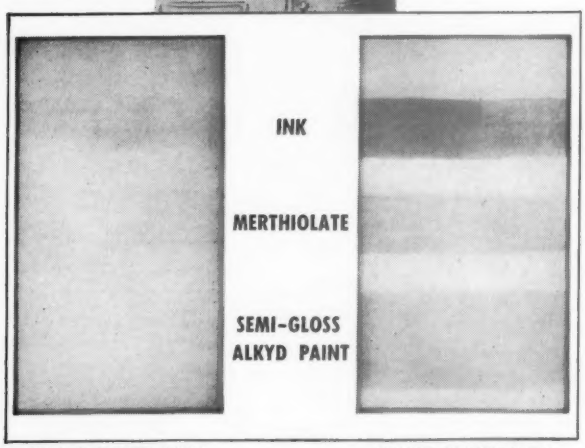
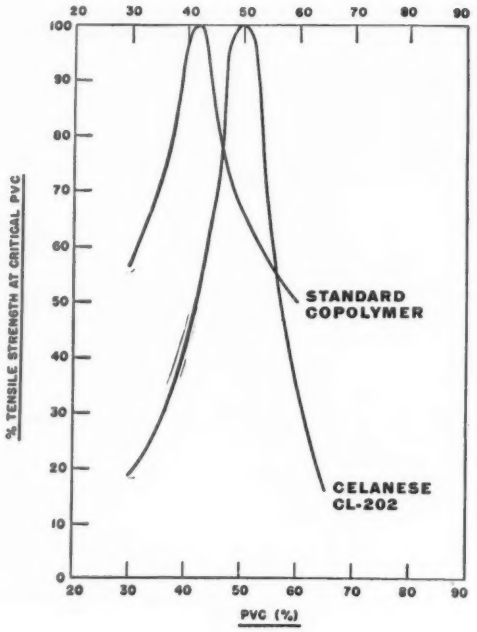


PRIMER SEALER WITH CELANESE EMULSION

PRIMER SEALER WITH STANDARD EMULSION

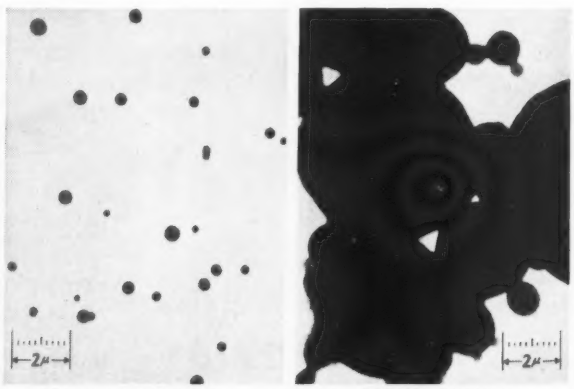
LOW TEMPERATURE COALESCENCE. Pictured above are two primer sealers identical in formulation except for the emulsions used (both homopolymers). These primers were cast (4 mil wet film) at *34° F. on glass* and allowed to *cure overnight at this temperature*. The paints were then stained and photographed from the reverse side of the glass. The primer on the left made with Celanese PVAc exhibited superior film coalescence as evidenced by the sharp reduction in stain penetration.



HIGH PIGMENT BINDING. Celanese emulsions are designed as paint vehicles. Because of this they exhibit extremely high pigment binding capacity. The above graph was prepared by plotting the tensile strength of paint films at progressively higher PVC's. A standard formulation was used and only the emulsions differed. In this comparison (both copolymers) the Celanese emulsion exhibited a critical PVC of 8% above the other copolymer.

CELANESE EMULSION STANDARD EMULSION

SUPERIOR FREEZE-THAW STABILITY. The two emulsions pictured above have been subjected to a standard freeze-thaw stability test (1 cycle = —14° C. for 16 hours, then thaw at room temperature). The Celanese PVAc emulsion at the left successfully passed a repeated freeze-thaw cycle while the one at right coagulated after 1 freeze-thaw cycle.



CELANESE EMULSION STANDARD EMULSION

FINE PARTICLE SIZE. The "inside story" of Celanese improved PVAc emulsions is clearly demonstrated in the above photomicrographs. Fine particle size indicates higher pigment binding, better non-settling, tighter, more closely knit films and better penetration of chalky or porous surfaces when applied at low viscosities.

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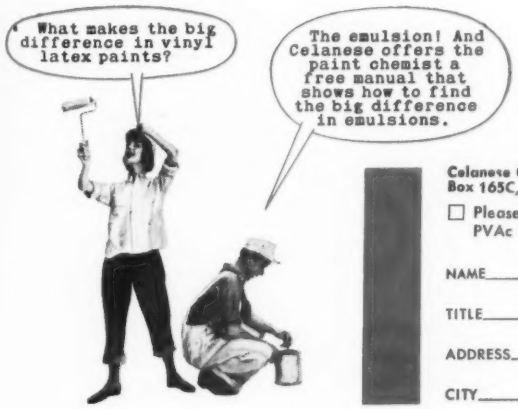
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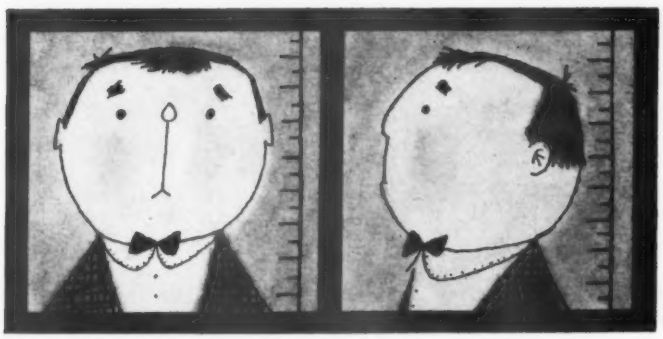

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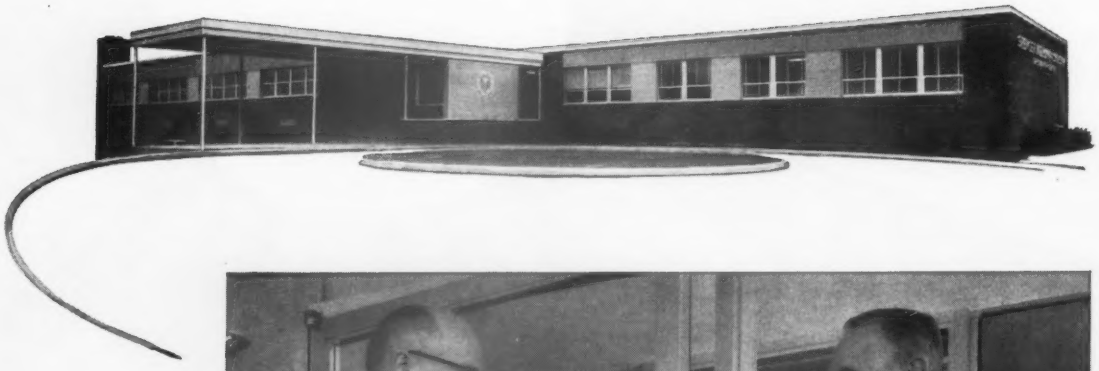

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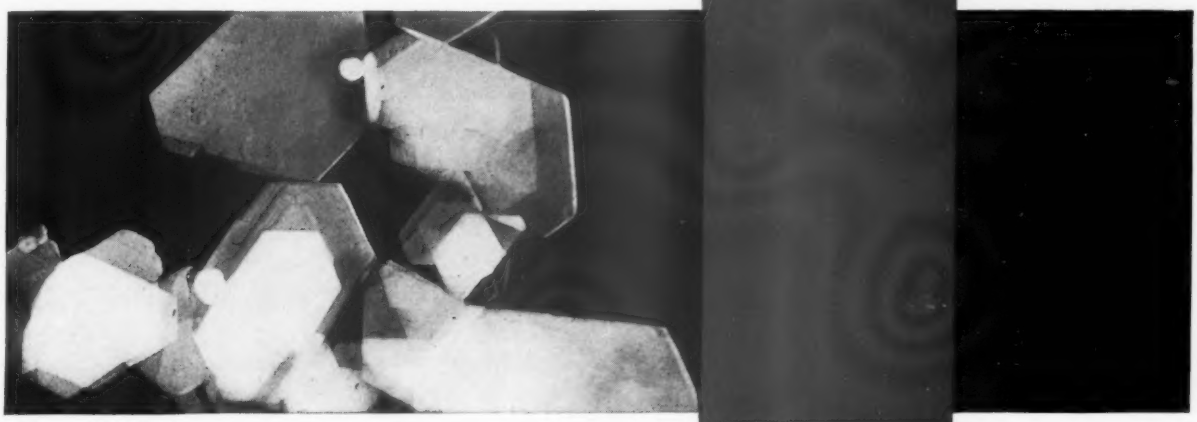

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USEFUL AS MAINTENANCE PAINTS IN CORROSSIVE ENVIRONMENTS:

CHLORINATED RUBBER PAINTS

By

F. K. Shankweiler*

TO have a clear understanding of chlorinated rubber it would be desirable to first look at the property of natural latex rubber which is the starting point, to observe why chlorination is desired, and how properties are changed. A comparison of the principal properties of natural rubber and chlorinated rubber is presented in Table I.

In other words, by the treatment of rubber with chlorine, excellent chemical resistance and freedom from oxidation are achieved while at the same time providing a film-forming material that is sufficiently low in viscosity to permit proper modification, simplified application, and solubility in economical and practical solvents. When rubber is chlorinated a film-forming material is made, which has good electrical properties, flame resistance, and freedom from odor and taste.

Rubber	Chlorinated Rubber
Attacked by chemicals	Chemically resistant
Attacked by oxidation	Not subject to oxidation
High viscosity—low solids	Very practical solids at application viscosities
Poor solubility and poor compatibility preventing modification	Good compatibility which means practical modification
Soft and elastic, but by oxidation it quickly becomes hard, brittle and exhibits film failure	Hard and relatively brittle requiring plasticization in formulation

Table I. Properties of natural rubber and chlorinated rubber

Film Properties

When chlorinated rubber is cast into films a clear, practically colorless film is obtained. The film is very hard, approximately 75% of glass. It is not particularly flexible; and if a film, applied to metal for example, were given hard shock by impact, it would crack and exhibit inadequate adhesion. Such a clear, unmodified film when exposed to heat and sunlight would become discolored and brittle by polymer degradation. As a consequence of these properties, suitable resins are used with chlorinated rubber to achieve adhesion, plasticizers to achieve flexibility, stabilizers to impart resistance to heat and ultraviolet light, and pigments to further improve resistance to sunlight. Perhaps this leads to the first feature of confusion which has often come to our attention. We have heard reference to so-called "straight chlorinated rubber coatings." We know of no specific coating composition in which chlorinated rubber is used for corrosion resistance without modification by at least a plasticizer, stabilizer, and pigment, and usually a resin. Since to our knowledge no unmodified chlorinated rubber coating is of commercial importance, it becomes obvious then that anyone interested in corrosion-resistant coatings must also be concerned with the kind and extent of resin, plasticizer, stabilizer, and pigment modification.

The kind and extent of modification of chlorinated rubber coatings is particularly pertinent because of the property of chlorinated rubber to be widely compatible with most of the paint raw materials, but this property is also an evil with respect to corrosion-resistant coatings if it is not fully recognized. The possibility of wide

*This article is based on a talk given by Mr. Shankweiler before the St. Louis Coatings Society. Mr. Shankweiler is Sales Mgr. of Coatings Materials, Hercules Powder Co.

modification of chlorinated rubber and broad classifying of vastly different formulas has led to considerable confusion which may be clarified by perhaps an oversimplified but, nevertheless, pertinent presentation. From a practical point of view for this discussion, we believe that a distinction must be made between four types of chlorinated rubber coatings which are made in volume.

Modifiers

The first category we can define as chlorinated rubber coatings in which 50-60% of nonvolatile film is chlorinated rubber modified with resins, plasticizers, and stabilizers, which are in themselves inert to the chemicals which are to be considered in the corrosion problems. For example, if a small amount of linseed oil, alkyd resin or other saponifiable material is added to a chlorinated rubber coating which is to be subjected to immersion in 5% caustic at, let us say, 100° F., it will be very evident that the small amount of saponifiable material has detracted appreciably from the resistance to caustic. Similarly the inclusion of any resin or plasticizer which is known to chemically react with acids, salts, and environments that are involved would detract from the excellent chemical resistance characteristic of chlorinated rubber. It is not the particular purpose to become involved in boring formulation details, but rather to point out that if good formulating practice is used, then a high order of resistance to corrosion is obtained. In the October 1954 issue of *Corrosion*, page 351, the chemical resistance of polyvinyl chloracetates is shown. At the T6A Committee of N.A.C.E. at Chicago in March 1955 a similar paper relating to chlorinated rubber was presented. Since the most pertinent reason to discuss chlorinated rubber is its corrosion resistance, it would seem appropriate to quickly observe the relative merit of chlorinated rubber coatings compared to the published data on vinyls (see Table II).

It is evident that neither material has universal resistance to all of the chemicals that are involved individually. There is to our knowledge no air-drying coating which is perfect in all respects. It is also evident, however, that the order of chemical resistance of a chlorinated rubber coating that is formulated as defined in the first category is very high.

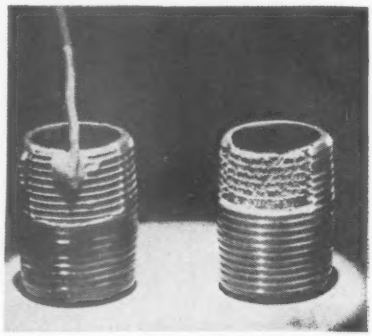

Figure 1. Chlorinated rubber paint 1 mo. in HCl

An interesting experiment is shown in Figure 1, which illustrates the resistance of chlorinated rubber coatings of this type to hydrochloric acid. A steel nipple was coated with chlorinated rubber except in an area that was purposely masked. After one month in hydrochloric acid, it is evident that the steel has been badly eaten away without, however, disintegration of the chlorinated rubber coating. In experiments involving steel in hydrochloric acid or similar aluminum pieces in caustic, we have completely dissolved the metal, leaving a shell of the chlorinated rubber coating from which the metal has been dissolved.

So that there will not be any misleading inferences from such an experiment, we must point out that the film thickness is much greater than a 3 to 5 mils, which is the normal paint coat. The film thickness in this instance was about 20 mils. In such experiments considerable hydrogen gas is formed, and if the coating thickness is thin obviously blisters will form by the tremendous pressure that is developed. The thick films were used so that the pressure would not distort the coating. At the same time, however, it is evident after such experiments that no harm has come to the coating subjected to 10% hydrochloric or 5% caustic. The chemical resistance of chlorinated rubber can probably be summarized by merely stating that numerous authors have indicated in the literature the fact that chlorinated rubber as an overall coating is generally regarded as comparable to polymers such as vinyls, neoprene, epoxy, Saran, etc. On the other hand, there are many modifications of chlorinated rubber illustrated by three other categories, the second of which has good chemical resistance but not quite as effective as the first.

In the second group would be a coating containing 45-60% chlorinated rubber in which part of the resin and plasticizer would be such things as alkyd resin, oxidizing oils, or chemical plasticizers, which are known to be somewhat affected by the alkalies in which we may be interested. These resins and oils, however, are known to improve the outdoor durability of chlorinated rubber coatings. This type is then adequately resistant for most exterior chemical exposures and has the weathering required.

The third category is represented by films which have 20-35% chlorinated rubber and the balance resin, of which alkyds are typical examples. In this instance, the durability of outdoor weathering matches the durability of the best kind of coating that we have seen. It would, for example, match the durability of a straight alkyd coating, the durability of which in a rural atmosphere is equivalent to the best. Parlon-alkyd composition, however, though having improved chemical resistance to the alkyd must be recognized as not equivalent to the first or second category.

The fourth class is illustrated by compositions which contain 5-15% chlorinated rubber and the balance some other kind of resin such as a phenolic or an alkyd. Obviously in the last category one is fundamentally obtaining the characteristics of the resin that has been employed and is merely obtaining chemical resistance, hardness or drying time from the chlorinated rubber in proportion to the amount that is present. It is unfortunate in many ways that many people frequently call the last two categories of coatings "chlorinated rubber.' In consideration of this type of product, it is obvious that one should know whether or not they are considering the first and second category or the third and

Table II

CHEMICAL RESISTANCE OF CHLORINATED RUBBER—POLYVINYL CHLOR-ACETATES

Corrosion Medium	Chlorinated Rubber	Polyvinyl Chlor-Acetates
Acids		
Sulfuric, 10%	R	R
Sulfuric, Concd.	R	NR
Hydrochloric, 10%	R	R
Hydrochloric, Concd.	R	NR
Nitric, 10%	R	R
Nitric, Concd.	NR	NR
Phosphoric, 10%	R	R
Phosphoric, Concd.	LR	LR
Hydrofluoric, 10%	R	R
Hydrofluoric, 30%	R	LR
Lower Fatty, e.g., Acetic, 20%	R	NR
Lower Fatty, e.g., Acetic, Concd.	NR	NR
Higher Fatty, e.g., Oleic	NR	LR
Organic Food, e.g., Citric	R	R
Water		
Tap	R	R
Distilled	R	LR
Sea	R	R
Alkalies		
Sodium Hydroxide, Dilute	R	R
Sodium Hydroxide, Concd.	R	LR
Calcium Hydroxide	R	R
Ammonium Hydroxide, Dilute	R	R
Ammonium Hydroxide, Concd.	NR	LR
Ammonium Salts	R	–
Sodium Carbonate	R	R
Oxidizing Agents		
Hydrogen Peroxide, 30%	R	LR
Sodium Hypochlorite	LR	LR
Calcium Hypochlorite	R	–
Chromic Acid, 40%	LR	LR
Chromic Acid, 5%	R	–
Sulfur Dioxide Solutions	NR	LR
Chlorine Water	R	LR

Corrosion Medium	Chlorinated Rubber	Polyvinyl Chlor-Acetates
Salt Solutions		
Alum	R	R
Ferrous Sulfate	R	R
Copper Sulfate	R	R
Sodium Chloride	R	R
Calcium Chloride	R	R
Sodium Sulfate	R	R
Sodium Phosphate	R	R
Sodium Acetate	R	R
Solvents		
Chlorinated Hydrocarbons	NR	LR
Aromatic Hydrocarbons	NR	NR
Aliphatic Hydrocarbons	LR	R
Alcohol (methyl, ethyl & butyl)	LR	LR
Ethers	NR	NR
Esters	NR	NR
Ketones	NR	NR
Phenol	NR	NR
Fats and Oils		
Mineral	R	LR
Animal	NR	LR
Vegetable	NR	LR
Halogens (Moist)		
Chlorine	R	LR
Bromine	NR	NR
Iodine	R	NR
Gases (Moist)		
Carbon Dioxide	R	R
Sulfur Dioxide	R	R
Chlorine	R	LR
Hydrogen Sulfide	R	LR

Legend

R = Recommended
NR = Not Recommended
LR = Limited Recommendation

	1	2	3	4
%Chlorinated Rubber of Film	50-60	45-60	20-35	5-15
%Nonreactable Resin or Plasticizer (Chlorine containing resin & plasticizer)	50-40	0-20	None	?
*Relative Rating:**				
Chemical Resistance	1	2	3	4
Outdoor Weathering	4	2	1	3
Adhesion	4	3	1	2
Film Toughness	4	2	1	3

Table III. Important properties of four types of chlorinated rubber coatings.

fourth. There has been much misleading information that is confusing because of a lack of appreciation between these types. By way of clarification, a few properties of these four kinds of coatings seem to be in order (see Table III).

Obviously such a table as this is an oversimplification. For example, in the fourth category, there are many compositions in which 5-15% chlorinated rubber is added to acrylic resins. The acrylic resins are highly chemically resistant, good in outdoor weathering; and, therefore, the addition of Parlon to such a resin is capable of putting such a composition in an entirely different class than we have indicated for this category, but again by the knowledge of the type of resin that is involved, it is not difficult to obtain a clear concept of the utility of the coating for the combination of corrosion resistance and outdoor durability which is involved many times in considerations of print protection.

In general, chlolanated rubber coatings are known to have extremely good resistance to water and humidity. In the literature, the moisture permeability of chlorinated rubber coatings is shown to be of a very low order. Most of the paint coating materials have much higher permeability to water than chlorinated rubber.

Having demonstrated that chlorinated rubber has many important advantages but that to acquire benefit to the fullest extent necessitates intelligent consideration of formulation; the next subject would relate to the practical applications of this information.

Metal Preparation

A great deal of consideration has been devoted to the subject of metal preparation with all of the polymers which are used for metal protection. Undoubtedly sand- or shotblasting as a first step is regarded as the best practice with any kind of coating to achieve the best protection against corrosion. One of the advantages of this procedure is that a rough surface to which a coating can obtain mechanical bonding is one of the important points of merit. Obviously a second point of merit is that all corrosive products have been eliminated. Such a procedure has been commercially used with respect to the vinyl coatings for the simple reason that a comparison between vinyls applied to rough surfaces where they could achieve a mechanical bond and vinyls applied to a smooth surface has frequently resulted in loss of adhesion in the latter case. In this connection, however, folks have taken advantage of the adhesion of a Parlon primer and have applied vinyl topcoats to it.

Certainly in the case of chlorinated rubber coatings, sandblasting is known to achieve better results. A typical illustration is that in one series of tests extending over an eight-year period, it was established that a chlorinated rubber coating applied to metal that was judged to have about 10% mill scale required repainting in five years. In the instance of sandblasted metal, however, after eight years' immersion in water, repainting except for spot repair was still not indicated. We cannot discount the merit of sandblasting, but in many instances it is frequently not economically practical or, is impossible for other reasons such as in our own plants where we are concerned with product contamination.

It is in the field of protecting equipment which cannot be sandblasted that chlorinated rubber coatings are comparatively most outstanding. In this field there are two considerations that are pertinent: In the first place, the question of how well the coating will stand up when applied to, let us say, wire-brushed surfaces on which there remain relatively tight products of corrosion. The second point relates to the difficulty that may be involved in applying a coating to surfaces on which part of the "old paint" still remains.

Chlorinated rubber coatings have relatively good adhesion to wire-brushed surfaces. The practice of wire-brushing is one in which the plants of Hercules have had a good deal of experience because we have applied most of the coatings in the last 20 years to wire-brushed surfaces. Fundamentally the protection of such surfaces is our problem, though our plant engineers have been open-minded in making many tests following procedures and coatings which have required a sandblasted surface. We have found that when considering the cost, excellent results can be obtained on a wire-brushed surface with chlorinated rubber coatings. One of the typical tests that we

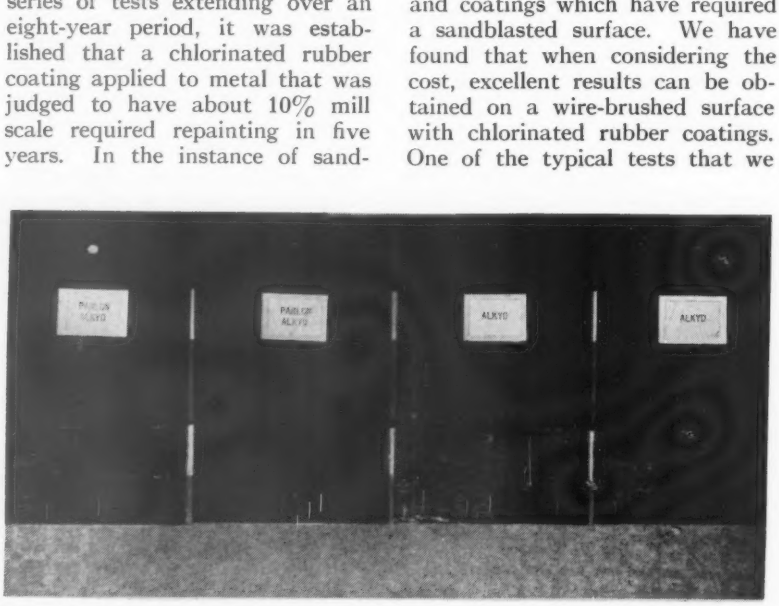

Figure 2. Effect of "Parlon" in alkyd over prerusted steel—45 days salt-fog.

have made will be commented upon further (see figure 2) when we consider the factor of film thickness.

The difference between an alkyd red lead primer and a Parlon-alkyd primer is evident. Rusting underneath the alkyd was much more rapid.

In the matter of applying Parlon coatings to old paint films, again there is interesting merit in chlorinated rubber coatings. Compositions containing ketones have a tendency to lift oxidizable coatings such as linseed oil, alkyd resins, etc. Chlorinated rubber has frequently been applied to old paint films of this character without difficulty. A recent experience which comes to mind is one in an acidic industrial environment on the west coast, where an alkyd coating had failed in six months. The surface was wire-brushed, the loose alkyd was removed, but a large portion adhered tightly and, therefore, remained. Chlorinated rubber was applied over both the bare metal and the old alkyd, and when followed three years later had held up well in the environment which had caused premature alkyd failure previously.

The ability of a chlorinated rubber coating to coat over an alkyd primer for example is illustrated in the Harvey System, in which vinyl topcoats are applied over the chlorinated rubber.

Film Thickness

The subject of film thickness is extremely important. An experiment at one of our plants illustrates several points (see Figure 3 and Table IV).

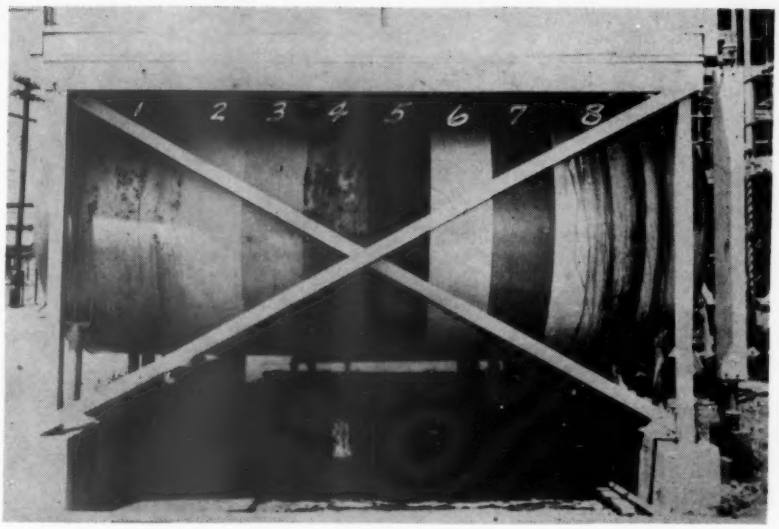

Figure 3. Test areas for evaluation chlorinated rubber systems

First, the manner in which our plants have made hundreds of tests over the years with all kinds of coatings; and second, the importance of film thickness in long range protection. The metal preparation of this tank was wire-brushing except for the one area where we have compared a vinyl coating. In this instance the surface was sandblasted as is universally recommended.

In sequence, the first area to observe is an area where two coats of chlorinated rubber were applied to a wire-brushed surface. The first of the two coats was not the normal inhibiting primer, but was rather what is regarded as a gray topcoat formulation. In three years of outdoor exposure in an atmosphere in which nitric and hydrochloric acid prevail, the corrosion which took place is very evident. We might say that such coatings as alkyds or phenolics, that we have tested in this area, fail badly in from three to nine months.

In the second area, we have a similar wire-brushed surface on which a chlorinated rubber primer was followed by two chlorinated topcoats. There is considerable corrosion, though by no means is it as bad as that which occurred without primer.

In the next area, we applied a chlorinated rubber primer to a wire-brushed surface and followed with four gray chlorinated rubber topcoats. In this instance, we obtained a film thickness of approximately 5.5 mils. In both of these areas, which represent this type of coating system, no corrosion was evident after three years.

These areas are to be compared with a vinyl system. In this instance the area was sandblasted. The coating system was a vinyl wash primer, a vinyl zinc chromate inhibiting primer, and five gray vinyl topcoats. The system was similar to the vinyl Navy Specification. The vinyl was not modified with alkyd resin which would detract from the chemical resistance. In this instance the coating thickness was again approximately 5.5 mils, which makes it comparable to the chlorinated rubber areas where the same thickness was involved. It is significant and we believe that it ties in with other commercial practice, that about seven coats of vinyls are required to obtain a

SYSTEMS TESTED FOR 3 YEARS
HNO_3 and HCl Atmospheric Exposure

Tank Section No.	Metal Preparation	Coating Material
4	Wire Brushed Metal	2 Coats Parlon Topcoat
1	" " "	1 Primer — 2 Parlon Topcoats
2	" " "	1 " 4 " "
6	" " "	1 " 4 " "
5	" " "	1 " 4 " Different Color
7	" " "	1 " 4 " " "
3	Sand Blasted	1 Wash Primer Vinyl 1 Zn Chromate Vinyl Primer 5 Vinyl Topcoats

Table IV

	A	B	C
Hours required for cleaning and preparation of metal surface for wire-brushing	13	36	50
Hours for applying primer for brushing	5	5	5
Hours required for applying color coating by brushing	8	8	8

In the areas of B and C, sandblasting costs from 20c-30c per square feet.

Table V. Labor per 1000 sq. ft. of area

COST OF MAINTENANCE PAINTING OF 18′ DIA. 21′ HT. TANKS IN HNO_3 OUTDOOR ATMOSPHERE (Badly Corroded Surface)

	Chlorinated Rubber		Vinyl
No. of Coats	3 (1 Prime)	5 (1 Prime)	7 (1 Wash) (1 Prime)
Film Thickness (mils)	3.5	5.5	5.5
	Cost Per 1,000 Sq. Ft.		
Metal Preparation			
Wire-brushing(1)	$ 75.60	$ 75.60	—
Sandblasting	—	—	$215.00
Labor(2) for brush application	44.10	77.70	102.90
Paint	54.20	90.40	122.50
Total	$173.90	$243.70	$440.40
Life for Major Repainting (yrs.)	1.5	5	5
Cost Per Sq. Ft. Per Year	11.6c	4.87c	8.8c

Notes: (1) New structural steel and processing equipment is sandblasted.
(2) Labor at $2.10/hour.

Table VI

WHY CHLORINATED RUBBER IS PREFERRED BEYOND COST/SQ. FT./YR:

1. Good adhesion to corroded surface.
2. Can go over old paint.
3. Can be brushed reasonably well or sprayed in reasonable thickness per coat.
4. Solvents reasonably good economically and from toxicity point of view.
5. Paint stability good.

Table VII

film thickness equivalent to five coats of chlorinated rubber. We recognize that hot-spray techniques have diminished the number of spray coats required with vinyls to obtain a given film thickness; but this same technique can be applied to chlorinated rubber coats as well, and due to the higher solids in a chlorinated rubber coating the relative comparisons continue to be in favor of chlorinated rubber. We recognize that topcoats can be changed to what we call mastics. When one is considering a mastic, then all concepts as they apply to normal solution coatings disappear because chlorinated rubber mastics, for example, can be applied to as much as 20 mils in one spray coat application by the use of suitable equipment. We do not want to dwell on the subject of hot spray or mastics, except to point them out since they are important directions in which industry will be moving in the next few years. Rather, however, the point that we are sure of, from the specific test that is shown by the slide is that in a nitric and hydrochloric atmosphere exposure for three years, 5.5 mils of chlorinated rubber applied to a wire-brushed surface showed no corrosion whereas there was some corrosion with the best practice with a vinyl coating applied on sandblasted metal in the same exposure. The difference in the cost of wire-brushing vs. sandblasting from our own experience varies from 2.5c to 10c per square foot compared to 20.5c to 30c per square foot. The cost of 5 mils of chlorinated rubber is likewise lower than 5 mils of the vinyl used in these comparisons. This leads us to the subject of cost.

Cost

The cost of applying paints varies a great deal depending upon the amount of labor required to clean the surface prior to paint application. The results of experience at our own plants give three typical figures: (1) the preparation of flat areas of metal tanks, etc.; which are in reasonably good shape prior to repainting; (2) the preparation of flat areas which are badly corroded prior to repainting; and (3) the preparation of I beams, trusses, etc., where cleaning is rather complicated. Typical labor per 1,000 square feet of area for three conditions is shown in Table V.

The experience that we have had with chlorinated rubber indicates that we obtain 275 square feet per gallon per coat. From these figures then, the cost of metal protection can be illustrated by considering the 3- and 5-coat protection that was shown in the slide when discussing film thickness. Cost and other advantages for the use of chlorinated rubber coatings are given in Tables VI and VII respectively.

Basically, one of the reasons that the Hercules Powder Company began the manufacture of chlorinated rubber had to do with the

(*Turn to page 75*)

THE EFFECT OF IMPACT TESTS ON LIFE OF PAINT SYSTEMS

New methods for the evaluation of the effect of impact tests on the life of paint systems over metal phosphate treatments on steel

By
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THE question of the effect of different metal phosphate materials as paint bonding agents for the pre-treatment of steel has often been discussed in recent years. This research group has participated in this matter in two papers, which were presented at the Fall Meetings of the *American Chemical Society* in 1952 and 1953 (1) (2). Methods for studying metal phosphate coatings have been presented on these occasions. The present paper is concerned in particular with the development of methods for the study of the influence of different metal phosphates on the impact characteristics of the treated surfaces, both with and without paint application. It is further concerned with the study of the extent to which these methods allow us to evaluate the influence of the impact tested areas of the steel surface on the salt-fog exposure behavior of the whole surface; that is, they had to be applied to a study of the impact effects and of their accelerating effect on local corrosion with or without subsequent paint application. In addition to the procedures described in the above mentioned papers, the following two approaches were also used:

1. The electrographic prints, produced in the usual manner (1) (2), were evaluated by observing the change in reflectance occurring in the prints prepared from exposed panels, as compared to that of the initial white prints prepared from the unexposed panels. As corrosion proceeds from the thin test cross lines or other points of film injury, a progressive darkening in color of the prints takes place. This deepening in color can be measured in terms of the decrease in total reflectivity of the print, which then can be correlated with the period of salt-fog exposure causing this effect. Details of the method and its application are given in the experimental section of this paper.

2. Direct visual evaluation of exposed panels has been practiced for many years. In this investigation it was also shown feasible to apply standard methods of statistical analysis either to such evaluations of the panels themselves, or to the electrographic prints as well. By this means it was possible to interpret the results shown by visual inspection of the panels or by the electrographic prints by the application of simple statistical analysis to specific practical problems in the protective coating field. It also provided a means for the semi-quantitative comparison of direct visual analysis with evaluation by means of electrographic prints, and indicated that the two methods were equivalent, in the cases considered.

EXPERIMENTAL PROCEDURE

In order to test the methods under a representative variety of conditions, both zinc and iron phosphate treated panels were prepared, using different conditions of application, as well as different rinses and lengths of storage before testing. Some panels were also water rinsed under different conditions of pH. In all cases impact tests were made both before and after application of standard olive drab enamel top coats (TT E-485 b, Type II), to observe the effect of these changes in test conditions on different metal phosphate treatments.

Flow Diagram:

The actual sequence followed for specimen preparation and evaluation is shown schematically in Figure 1. Toluene degreased, cold-rolled, automotive steel panels were pre-treated with four different commercial zinc and iron phosphate preparations, each containing different accelerators, in a laboratory spray chamber. These phosphate solutions were prepared at the concentrations shown in Table I.

Application of the Phosphate Coatings:

The small laboratory spray chamber used to apply the phosphate pre-treatments to the steel panels, which has been described previously (1), consisted of an illuminated chamber enclosing a volume of about one cubic foot, equipped with facilities to circulate test solutions at controlled temperatures and pressures. With the exception of pre-treatment A, the steel panels were sprayed in turn with the phosphate solutions

This paper was presented before Cincinnati Meeting of the American Chemical Society, Div. of Paint, Plastics and Printing Ink Chemistry, April 4, 1955.

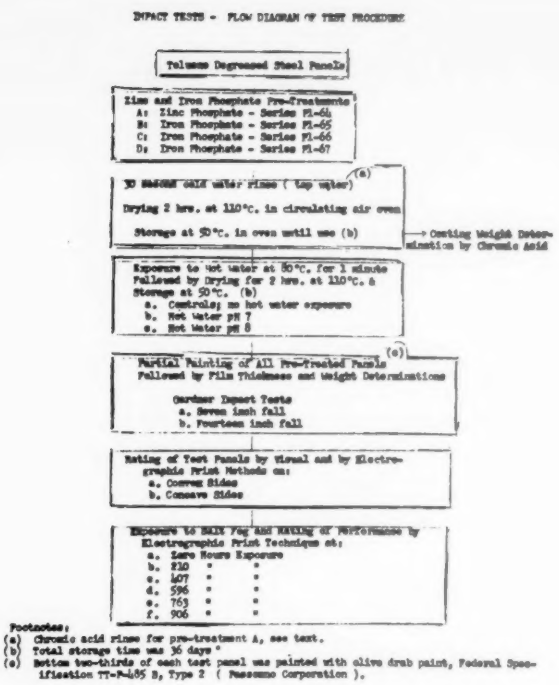

IMPACT TESTS - FLOW DIAGRAM OF TEST PROCEDURE
Tolmans Degreased Steel Panels
Zinc and Iron Phosphate Pre-Treatments
A: Zinc Phosphate - Series P1-64
B: Iron Phosphate - Series P1-65
C: Iron Phosphate - Series P1-66
D: Iron Phosphate - Series P1-67
(a)
30 Second cold water rinse (tap water)
Drying 2 hrs. at 110°C. in circulating air oven
Storage at 50°C. in oven until use (b)
Coating Weight Determination by Chromic Acid
Exposure to hot water at 80°C. for 1 minute
Followed by Drying for 2 hrs. at 110°C. &
Storage at 50°C. (b)
a. Controls; no hot water exposure
b. Hot Water pH 7
c. Hot Water pH 8
(c)
Partial Painting of All Pre-Treated Panels
Followed by Film Thickness and Weight Determinations
Gardner Impact Tests
a. Seven inch fall
b. Fourteen inch fall
Rating of Test Panels by Visual and by Electrographic Print Methods on:
a. Convex Sides
b. Concave Sides
Exposure to SALT Fog and Rating of Performance by Electrographic Print Technique at:
a. Zero Hours Exposure
b. 210 " "
c. 407 " "
d. 596 " "
e. 753 " "
f. 906 " "
Footnotes:
(a) Chromic acid rinse for pre-treatment A, see text.
(b) Total storage time was 36 days.
(c) Bottom two-thirds of each test panel was painted with olive drab paint, Federal Specification TT-P-485 B, Type 2 (Reasonne Corporation).

Figure 1. Flow diagram of test procedures

in the spray chamber for two minutes on each side (four minutes total) at 160 to 170 degrees Fahrenheit and 18 pounds per square inch gage nozzle pressure, followed immediately by a 30-second rinse in cold running tap water, and drying in an oven at 110 degrees Centrigrade for two hours. No chromic acid rinse was used on pre-treatments B, C and D.

In the case of pre-treatment A, the steel panels were exposed for one minute on each side in the spray chamber; and, following a 30 second cold water rinse, they were dipped for 30 seconds in an aqueous chromic acid solution at a pH of 4 to 5, and at a temperature of 75 to 90 degrees Centigrade. The panels were again rinsed for 30 seconds in cold running water and then dried for two hours at 110 degrees Centrigrade in a circulating air oven. It is evident that pre-treatment A differs from the usual application by having one additional water rinse after the chromic acid rinse. Pre-treatments B, C, and D differ from the usual procedure in that the customary chromic acid rinse is replaced by a direct water rinse. All panels were then stored at 50 degrees Centigrade in an oven prior to subsequent treatment.

Coating Weights:

Representative panels from each series of the above pre-treatments were then tested to determine the phosphate coating weight, or "stripping weight" as it is sometimes called. The stripping solution was 5% aqueous chromic acid. The panels were immersed in this chromic acid solution for 15 minutes at a temperature of 165 degrees Fahrenheit, this treatment being followed by a 30 second cold water rinse, acetone dipping, and drying at 50 degrees Centrigrade in an oven. The coating weights, expressed as the weight loss in milligrams per square foot of exposed area, are listed in Table II.

Storage:

After the panels had been phosphate pre-treated they were stored in an oven at 50 degrees Centrigrade while exploratory tests were in progress. When the work program was resumed, the panels had been stored for 36 days. This procedure is different from usual work practice, but since the panels of all treatments, A to D, were treated in the same way in this storage period, all subsequent tests are comparable.

Water Immersion Test:

Before paint application, the panels were divided into three groups. One was coated without further treatment at the end of the storage period. The second group was dipped in distilled water of pH 7 at a temperature of 80 degrees Centigrade for one minute. The third group was dipped for one minute at 80 degrees Centrigrade in water which was adjusted

Table I. Phosphate pre-treatment of steel panels for impact testing

Pre-Treatment Type (b)	Panel Series (c)(d)	Concentration of Commercial Phosphate Compound(a)
A	P1-64	316 grams of zinc phosphate compound plus 24 grams of sodium hydroxide, dissolved in four gallons of water. Solution pH = 3.25 at 30° C.
B	P1-65	170 grams of iron phosphate compound No. 1, dissolved in four gallons of water. Solution pH = 4.55 at 30° C.
C	P1-66	170 grams of iron phosphate compound No. 2, dissolved in four gallons of water. Solution pH = 4.55 at 30° C.
D	P1-67	1000 milliliters of iron phosphate compound No. 3; solution diluted to four gallons with water. Solution pH = 1.45 at 30° C.

(a) A bare steel panel was exposed for two hours in each of the above solutions prior to use.
(b) Pre-treatments applied in a spray chamber. See Figure 3 and text.
(c) Panel Series Designations as follows: P1-64 refers in turn to Notebook No. (P-1) - Page No. (-64), etc.
(d) Individual panels within each series impact tested and exposed to hot water as follows:
Panel Numbers -9, -11, -14 were seven-inch impact tested (see text).
" " -9, -12, -15 were fourteen-inch impact tested.
" " -8, -9 were controls having no hot water treatment.
" " -11, -12 were exposed one minute to hot water (80° C.) at pH 7.
" " -14, -15 " " " " " " " " at pH 8.

PHOSPHATE COATING WEIGHTS BY CHROMIC ACID STRIPPING(c)

Panel Number (a)	Pre-Treatment Type (b)	Coating Weights Expressed as Milligrams per Square Foot	
		Individual	Average
P1-64-3	A	152.6	147.6
-4	A	142.6	
P1-65-3	B	35.3	35.8
-4	B	36.2	
P1-66-3	C	68.9	67.8
-4	C	66.7	
P1-67-3	D	27.9	26.6
-4	D	25.3	

(a) Panel designations such as P1-64-3 refer in turn to Notebook No. (P1)- Page No. (64) - Panel No. (3).

(b) See Table I.

(c) See text for formulation of stripping solution and description of method.

Table II. Phosphate coating weights—chromic acid method

to a pH of 8 by adding a trace of potassium hydroxide. Water immersion was carried out in order to see if any water soluble material which might have been retained by the application of the phosphate treatment affected the impact tests. The immersion also removes any water soluble material which might have been formed during the above storage test. (2) The weight changes which occurred upon water immersion are listed in Table III.

Identification of the Panels:

To include these different test groups the panels are identified as follows:

Pre-Treatment Type	*Panel Series*	*Description*
A	P1-64	Zinc Phosphate I.
B	P1-65	Iron Phosphate II.
C	P1-66	Iron Phosphate I.
D	P1-67	Iron Phosphate III.

Panel Numbers

-8, -11, -14	Seven-inch impact tested.
-9, -12, -15	Fourteen-inch impact tested.
-8, -9	Controls. No hot water exposure.
-11, -12	One minute exposure to hot water at pH = 7
-14, -15	One minute exposure to hot water at pH = 8

Paint Application:

Following the above treatments, the bottom two-thirds of each steel panel was painted with Olive Drab Paint—Federal Specification TT-P-485 B, Type 2 (Passonno Corporation), using the slowest speed on a standard Fisher-Payne Dip Coater. The paint film thicknesses, which were observed to vary from about 2 to 3 mils., were measured with an Aminco-Brenner Magne-Gage, Model P-1547, according to A.S.T.M. Specification D 1186-'51 T, in three areas: One measurement was in the center of the panel; the two others, one inch above the lower edge of the panel, one 10/16" from the right edge, the other 10/16" from the left edge. The individual averages are tabulated along with the corresponding panel weights in Table III.

Impact Tests:

Both the painted and unpainted portions of the panels were then impact tested with a Gardner falling weight, variable type, laboratory impact tester. This apparatus, which was constructed according to the requirements of the Steel Kitchen Cabinet Institute Specifications, Section 5 (Tests for Cabinet Finishes), consisted of a one-half inch diameter hemispherical steel ball mounted at the tip of a two-pound hammer, which was allowed to fall vertically through a calibrated cylindrical guide, and thus strike the test panel. The test panel rested on a horizontal plate containing a hemispherical recessed area, so that both a concave and a convex exposure was obtained. The vertical scale was calibrated in one-inch intervals, and the hammer could fall through a vertical distance which could be varied from 1 to 14 inches, corresponding to 2 to 28 Gardner Units. Fig. 2 (pg. 37) shows two series of impact tests were carried out at room temperatures of 75 to 80 degrees Fahrenheit. In the first case the hammer was allowed to fall through a vertical distance of seven inches, and in the second case fourteen inches. Immediately following the impact tests, each panel was rated visually on the concave and convex sides of both

Table III. Phosphate pre-treated panel weights and paint film thicknesses

Panel Number (a)	Pre-Treatment Type (b)	Original Weight grams	Weight Change on Water Exposure mg.(c)	Weight of Paint Film Air-Dried one week grams (d)	Average Paint Film Thickness mils (e)
Series 1 - Exposure to Hot Water at pH of 7. (f)					
P1-64-11	A	154.2450	8	3.1306	2.58
-12	A	150.9230	20	3.1609	3.14
-13	A	147.5833	23	3.2734	3.14
P1-65-11	B	146.4636	5	3.1345	2.61
-12	B	147.6270	14	3.1316	2.64
-13	B	148.9625	22	3.1144	2.47
P1-66-11	C	153.9525	5	3.0600	2.55
-12	C	152.5363	12	3.0355	2.40
-13	C	150.5380	20	2.9918	2.45
P1-67-11	D	111.6161	5	2.9149	2.50
-12	D	111.0371	+ 7	3.0122	2.47
-13	D	113.9601	1	3.0712	2.70
Series 2 - Exposure to Hot Water at pH of 8. (f)					
P1-64-14	A	150.7349	6	2.9857	3.15
-15	A	150.5282	9	3.1072	3.16
P1-65-14	B	148.7928	+ 2	3.0530	3.15
-15	B	153.6634	7	3.1620	3.14
P1-66-14	C	152.6619	15	3.1182	2.91
-15	C	154.0772	16	3.1400	2.85
P1-67-14	D	111.9256	16	3.0237	2.66
-15	D	113.7810	20	3.0902	2.63
Series 3 - Controls - No Hot Water Exposure.					
P1-64-8	A	151.3382	-	2.5965	2.40
-9	A	149.3506	-	2.2281	1.58
-10	A	147.2161	-	2.1651	1.94
P1-65-8	B	148.6000	-	2.3320	2.27
-9	B	155.1710	-	2.7030	2.25
-10	B	149.5049	-	2.6863	2.25
P1-66-8	C	153.7353	-	2.7507	2.41
-9	C	156.0776	-	2.8097	2.23
-10	C	152.5746	-	2.9076	2.47
P1-67-8	D	151.9361	-	2.8140	2.60
-9	D	149.5791	-	3.0470	2.60
-10	D	150.3625	-	3.0841	2.63

(a) Designations such as P1-64-11 refer in turn to: Notebook No. (P-1) —Page No. (64)—Panel No. (11).
(b) See Table I and text for description of pre-treatment type.
(c) + sign indicates weight gain; all others represent weight loss.
(d) Paint applied by Fisher-Payne Dip Coater, and allowed to air-dry for one week.
(e) Average of measurements at three points as shown in Figure 4, according to A.S.T.M. Specification D 1186-'51 T, using an Aminco-Brenner Magne Gage.
(f) At temperature of 80° C. for one minute.

the painted and unpainted but phosphate pretreated areas. The spray chamber is shown in Figure 3. Panel areas used for film thickness determinations is depicted in Figure 4.

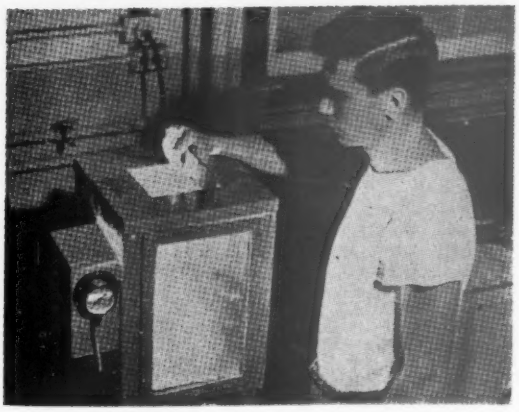


Figure 3. Salt-spray chamber

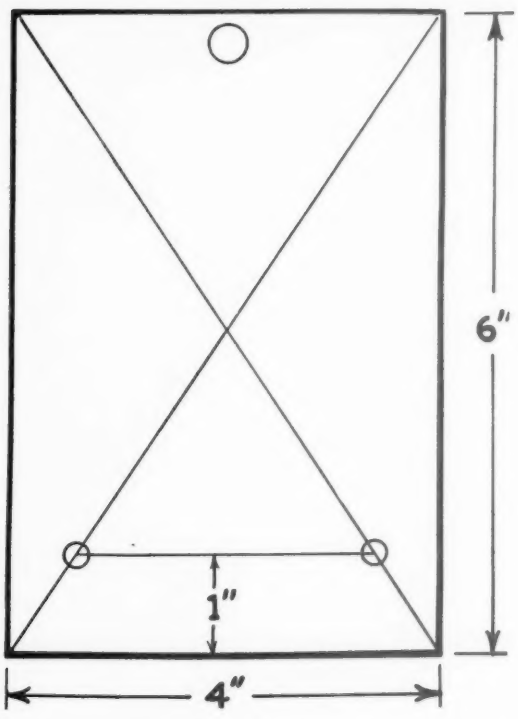


Figure 4. Panel areas used for film thickness determination according to A.S.T.M. method

The visual ratings are listed in Table IV, where they are compared with the corresponding ratings by the electrographic print method to be described below. The key to the visual and electrographic print ratings which are listed in Table IV is as follows:

VISUAL

0 indicates no visible damage.
2 " slight crazing.
4 " fine cracks, less than the thickness of a human hair.

(a)

CO-PARISON OF VISUAL AND ELECTROGRAPHIC PRINT RATINGS OF I'PACT TESTED PANELS

Panel Number (b)	Pre-Treatment Type (c)	Salt water Exposure (d)	Impact Height Inches	Panel Ratings After Impact at Top (T), and Bottom (B) of Painted Portions (e)(h)			
				Visual (e)(f)	Electrographic (e)(g)	Visual (e)(f)	Electrographic (e)(g)
				T B	T B	T B	T B
P1-4h-8	A	none	7	8 6	6 2	0 0	0 0
-P2-8	B	"	7	3 4	2 4	1 0	0 0
-P3-8	C	"	7	3 4	4 2	0 0	0 0
-P7-8	D	"	7	2 4	2 2	0 0	0 0
P1-4h-11	A	pH 7	7	7 7	6 6	0 0	0 0
-P2-11	B	" 7	7	3 5	4 4	0 0	0 0
-P3-11	C	" 7	7	3 3	2 4	0 0	0 0
-P7-11	D	" 7	7	2 4	2 2	0 0	0 0
P1-4h-14	A	pH 8	7	6 6	6 5	0 0	0 0
-P2-14	B	" 8	7	4 7	2 6	0 0	0 0
-P3-14	C	" 8	7	4 7	4 1	0 0	0 0
-P7-14	D	" 8	7	2 7	2 2	0 0	0 0
P1-4h-9	A	none	14	8 8	8 8	2 0	0 0
-P2-9	B	"	14	3 8	4 2	0 0	0 0
-P3-9	C	"	14	5 5	4 2	0 0	0 0
-P7-9	D	"	14	2 5	2 4	0 0	0 0
P1-4h-12	A	pH 7	14	7 7	6 4	2 2	0 0
-P2-12	B	" 7	14	6 7	4 4	0 0	0 0
-P3-12	C	" 7	14	8 7	6 5	1 1	0 0
-P7-12	D	" 7	14	2 7	4 2	0 0	0 0
P1-4h-15	A	pH 8	14	8 8	6 4	2 0	0 0
-P2-15	B	" 8	14	8 8	4 6	0 0	0 0
-P3-15	C	" 8	14	8 8	2 2	0 0	1 1
-P7-15	D	" 8	14	6 8	1 1	0 2	2 4

Footnotes:
(a) PANELS impact tested before exposure to salt fog with Gardner impact apparatus.
(b) Designations such as P1-4h-8 refer in turn to: Notebook No.(P1)-Page No.(4h)-Panel No.(8).
(c) See Table I and text for description of pre-treatment type.
(d) Exposure to hot water at designated pH at 60°C., except for unexposed control panels.
(e) Numbers from 1 to 10 refer to individual ratings at top (T) and bottom (B) impact points on the painted portions only of each panel. Low numbers indicate better condition.
(f) Visual ratings made immediately following each impact test.
(g) See text for description of electrographic print technique.
(h) See text for key to ratings.

Table IV. Comparison of visual and electrographic print ratings of impact tested panels

6 indicates course cracks, greater than hair thickness.
8 " paint peeling over area less than one centimeter in diameter.
10 " paint peeling over area greater than one centimeter in diameter.

ELECTROGRAPHIC PRINTS

0 indicates no visible penetration.
2 " slight penetration at impact points only.
4 " heavy penetration at impact points only.
6 " penetration at impact points plus slight penetration at other areas.
8 " complete general penetration over small areas less than one centimeter in diameter.
10 " complete general penetration over large areas, greater than one centimeter in diameter.

In order to present a complete and comprehensive picture of the impact test results, the visual ratings will be discussed following the description of the electrographic print technique and the salt-fog exposure.

Electrographic Prints

Since it is desirable to have available some permanent visual record of the damage caused by impact, an attempt was made to adapt the technique of electrographic printing (3) to the present purpose. By this method a photographic paper (a) saturated with a solution of an electrolyte and placed in contact with the test panel is mounted at constant pressure in a suitable press between two aluminum platens, as part of a low voltage direct current electric circuit. The current will flow only where breaks in the paint film occur, such as pinholes, cracks, and at test scratches, or at any other place where imperfections in the film destroy the insulating characteristics of the paint, such as by the spreading of corrosion from a break or hole in the paint film. Wherever

(a) Eastman Kodak Dye Transfer Paper, Type F, Double Weight, White Glossy, Smooth, is typical.

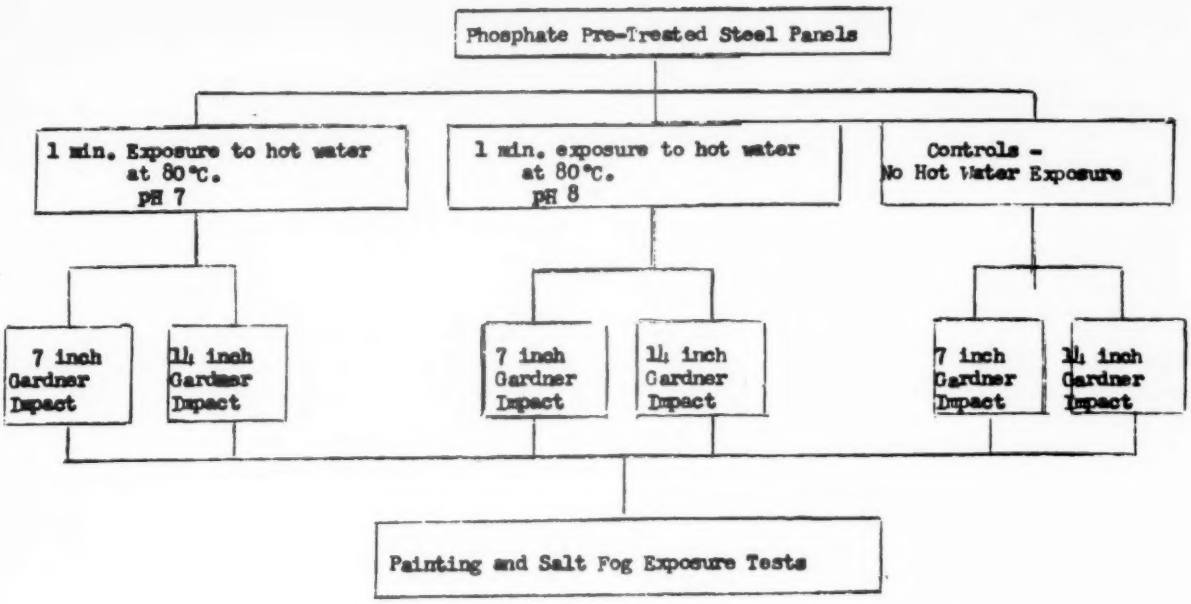

Phosphate Pre-Treated Steel Panels
1 min. Exposure to hot water at 80°C. pH 7
1 min. exposure to hot water at 80°C. pH 8
Controls - No Hot Water Exposure
7 inch Gardner Impact
14 inch Gardner Impact
7 inch Gardner Impact
14 inch Gardner Impact
7 inch Gardner Impact
14 inch Gardner Impact
Painting and Salt Fog Exposure Tests

Figure 2. Water exposure and impact tests of phosphate pretreated steel panels

the current flows, iron ions are transported to the photographic paper.

By developing the paper in a solution of potassium ferri- and ferro-cyanides, a permanent blue record of the imperfections and the extent of penetration beneath the paint film is obtained. The application of electrographic printing followed the same general technique as has been described in an earlier paper (3), except that no pressure was applied to the panels while they were mounted in the hydraulic press, in order to avoid damage to the convex sides of the impact test areas.

In this manner it was found that satisfactory prints could be made of the impact test results. It is to be noted, however, that this technique can only be applied to the painted portions of the panels, since the presence of an insulating film is necessary. The phosphate pre-treated, unpainted portions of the test panels, therefore, could not be conveniently evaluated by this means, since a uniform deep blue color can be developed over the entire unpainted area.

Comparison of Visual and Electrographic Print Ratings

The next question to be answered was whether or not the direct visual evaluation of the impacted panels agreed with the evaluation obtained by means of the electrographic prints. Two series of comparisons, therefore, were made on the painted portions as follows:

(a) Concave and convex sides for 7 inch impacted panels, and

(b) Concave and convex sides for 14 inch impacted panels. These results are listed in Table IV. The key to the numerical ratings has been described earlier. At this point it should be mentioned also that the expression "concave side" as used in this paper refers to that side of the steel panel which was struck by the impact hammer, and corresponds to the side on which the coating system is compressed, as distinguished from the stretching effect which occurs on the "convex side."

As may be seen by inspection of the data in Table IV, the two methods were in excellent agreement in all but a few isolated cases. Since the method of evaluation by the electrographic print technique was equivalent to the visual method, and in addition gives a permanent record, which can be used for independent inspection at any later date, it was used in all subsequent evaluations of the panels after exposure to the salt-fog as discussed below.

Evaluation of Electrographic Prints by Reflectance Measurements:

As a further aid in assigning numerical ratings to the electrographic prints, work has begun recently using a light meter to measure the total reflectance from the surfaces of a series of prints. Since localized corrosion of a test panel appears as a dark spot on an electrographic print, the progress of corrosion can be followed by the progressive darkening which occurs on successive prints. If, therefore, the total reflection of light from the surface of each of two electrographic prints taken at different stages of the corrosion history is measured by a reflectometer, then the difference in reflectivity will be a measure of the extent of corrosion, thus forming the basis for a more quantitative method of rating electrographic prints. The visual analysis scheme listed above is in reality an attempt to assess the total discoloration which occurs over a localized area. In practice, the new method measures the reflectance of the various prints with a reflection meter such as the Photovolt Model 610, using a search unit such as No. 610-D, which scans a surface two inches in diameter. The reflectance of the initial print prepared from the uncorroded panel is measured and assigned a value of 100% reflectance for the particular series. The reflectance is measured again on the electrographic prints taken after specified time intervals during test exposures to salt-fog, using a blank print to correct for any changes in background color caused by the developing solutions. The measured decrease in reflectivity of the prints taken at various stages of the corrosion can be expressed as a fraction of the original reflectivity and plotted versus time of exposure for each test series as shown in Figures 17 to 20.

In the present study such reflectance readings were taken on three areas of each panel and on the corresponding prints.

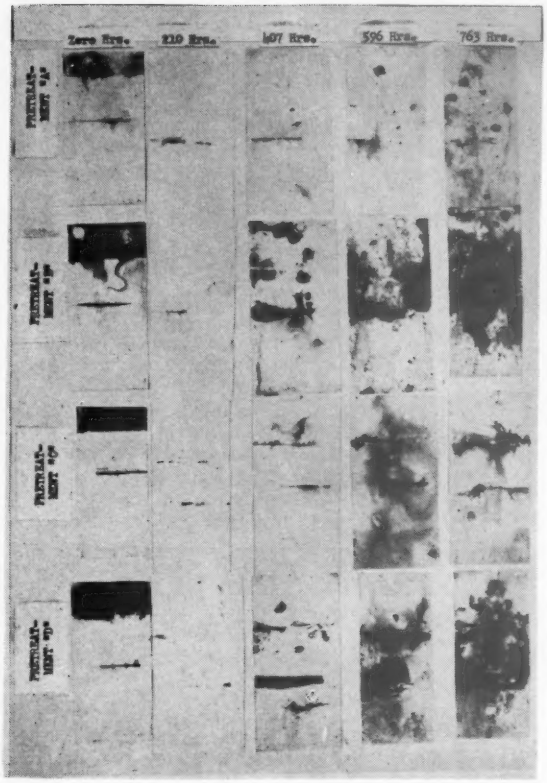


Figure 5. 7″ Impact — hot water, pH-7 — Concave side

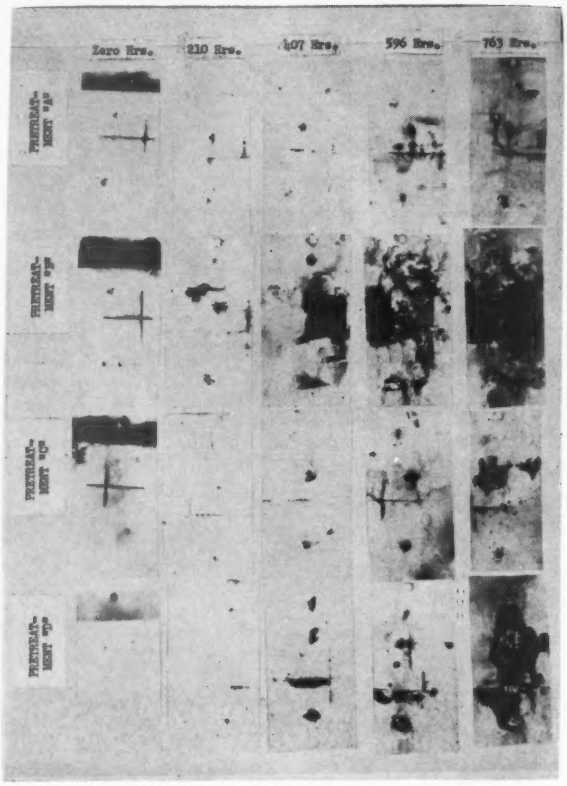


Figure 6. 7″ Impact — hot water, pH-7 — Convex side

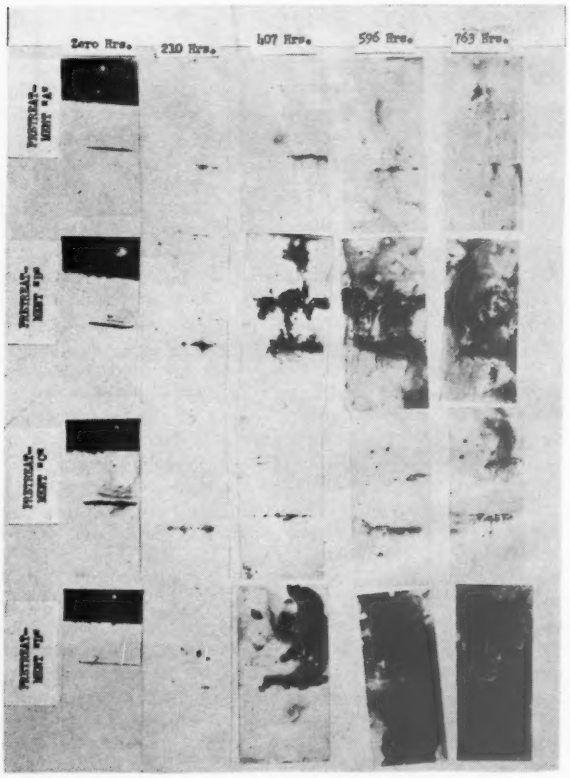


Figure 7. 7″ Impact — hot water, pH-8 — Concave side

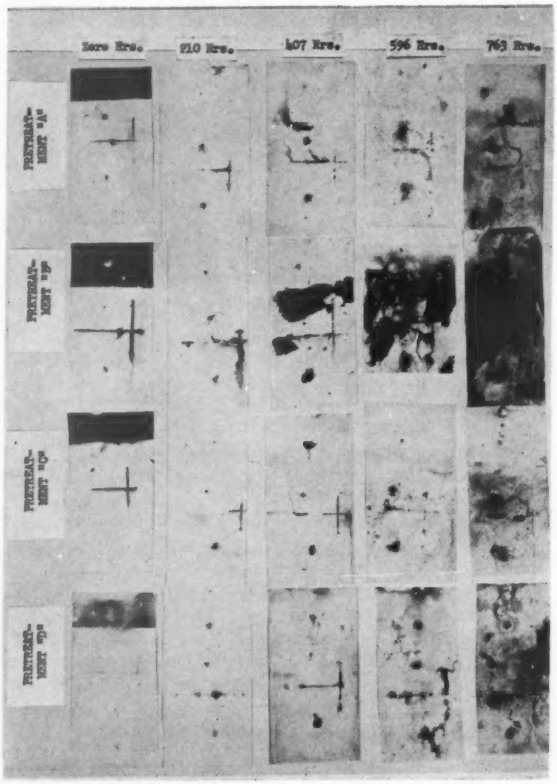


Figure 8. 7″ Impact — hot water, pH-8 — Convex side

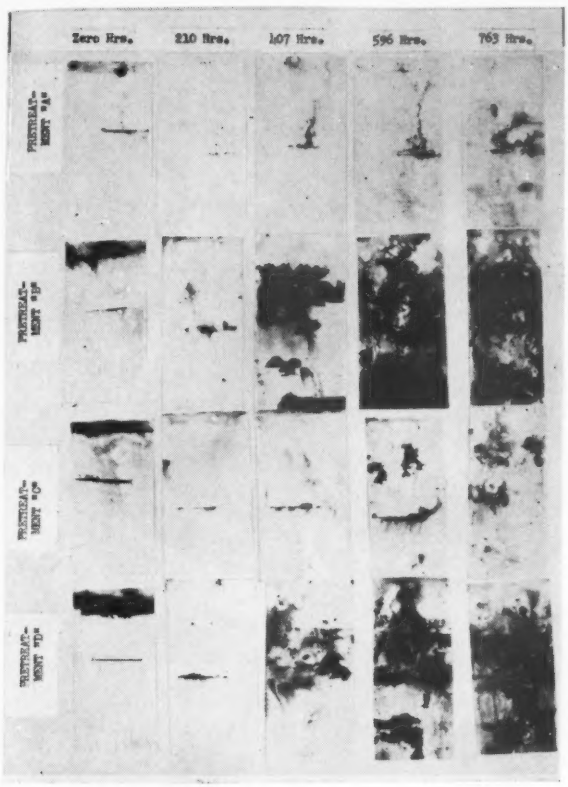


Figure 9. 7″ Impact — Control — Concave side

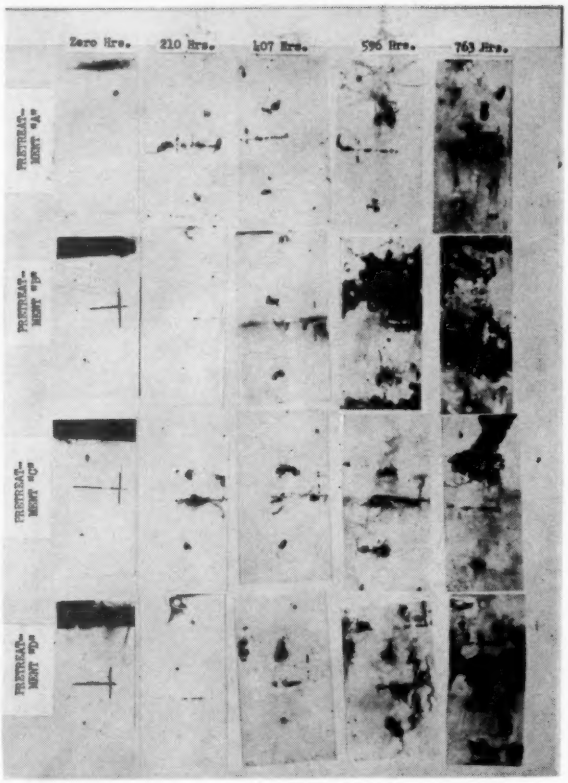


Figure 10. 7″ Impact — Control — Convex side

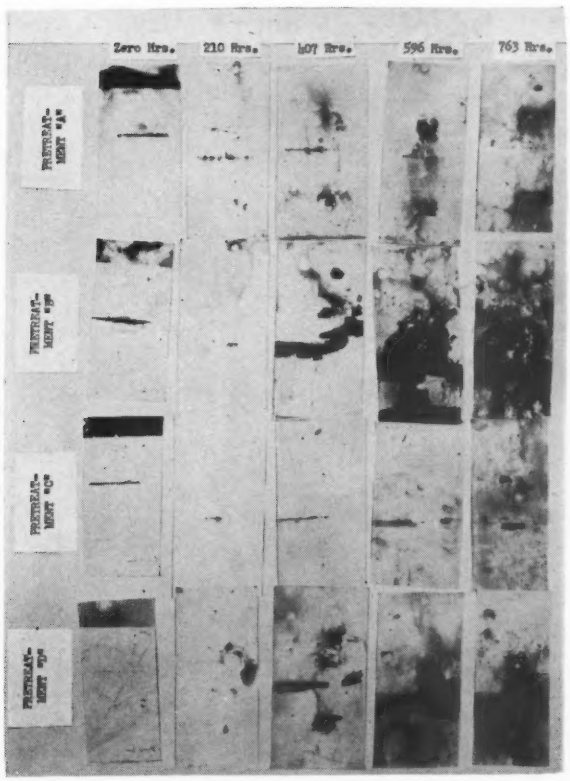


Figure 11. 14″ Impact — hot water, pH-7 — Concave side

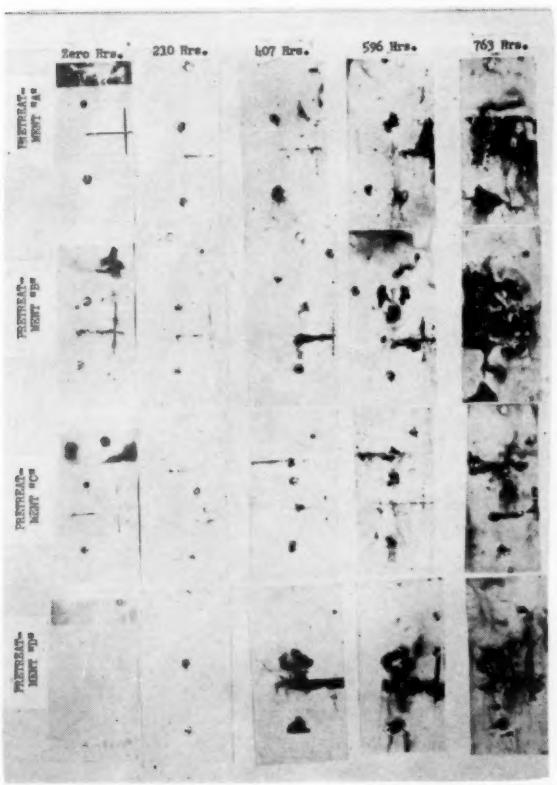


Figure 12. 14″ Impact — hot water, pH-7 — Convex side

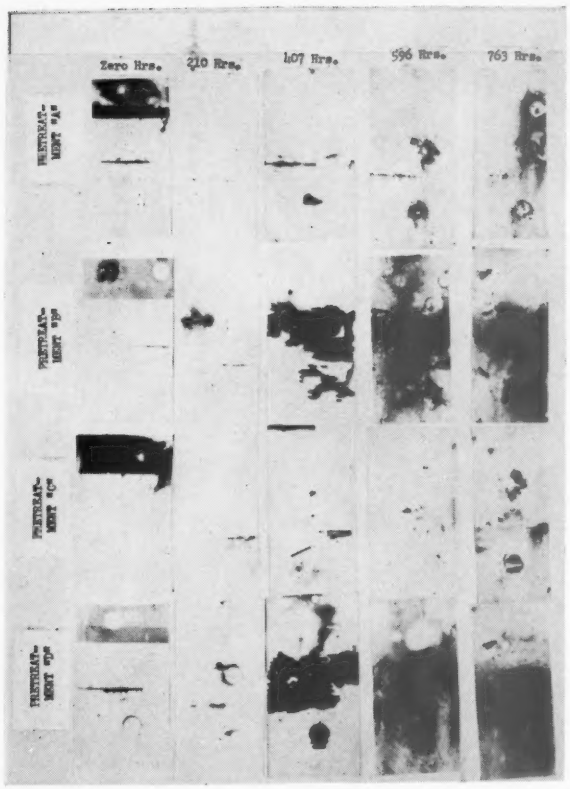


Figure 13. 14″ Impact — hot water, pH-8 — Concave side

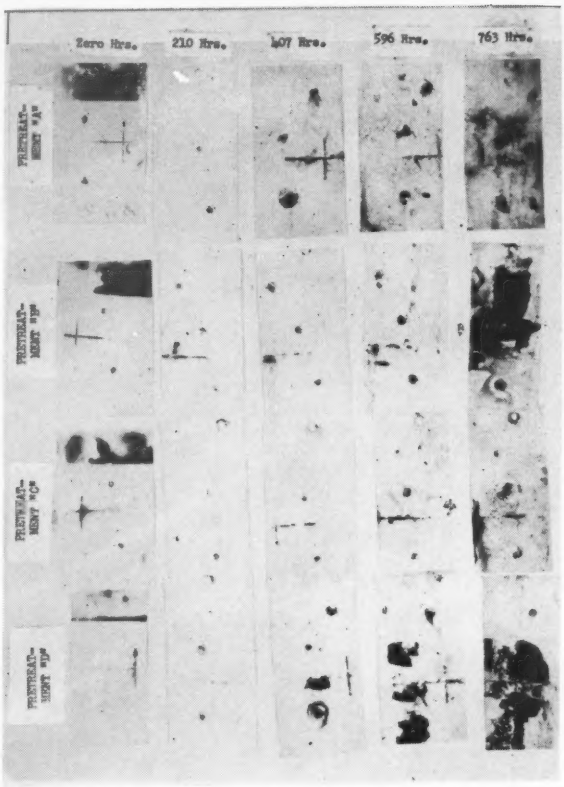


Figure 14. 14″ Impact — hot water, pH-8 — Convex side

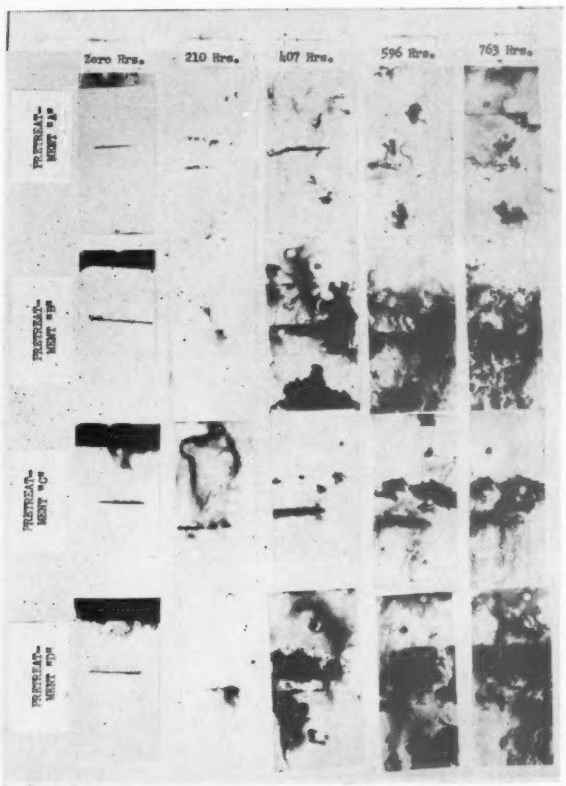


Figure 15. 14″ Impact — Control — Concave side

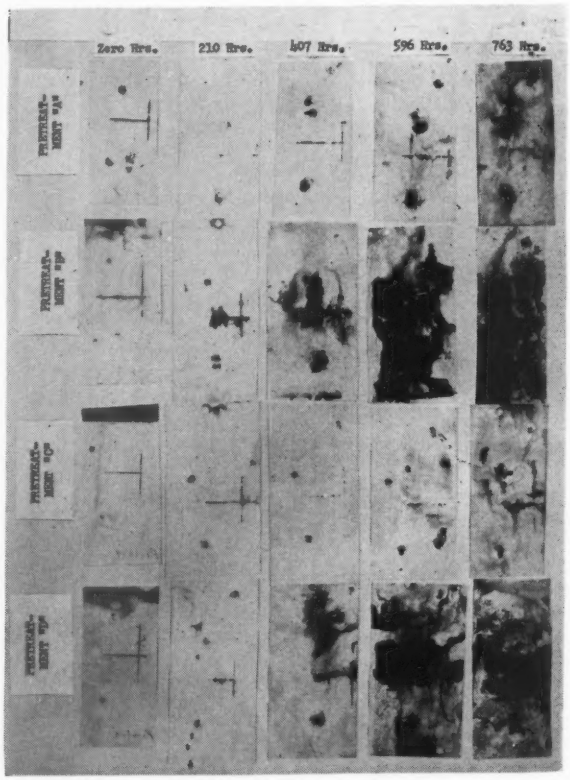


Figure 16. 14″ Impact — Control — Convex side

Changes in the reflectance values on the electrographic prints during the salt-fog exposure, comparing the area without impact with convex and with concave impact area. (Plotted % of reflectance versus time, up to 800 hours of salt-fog exposure)

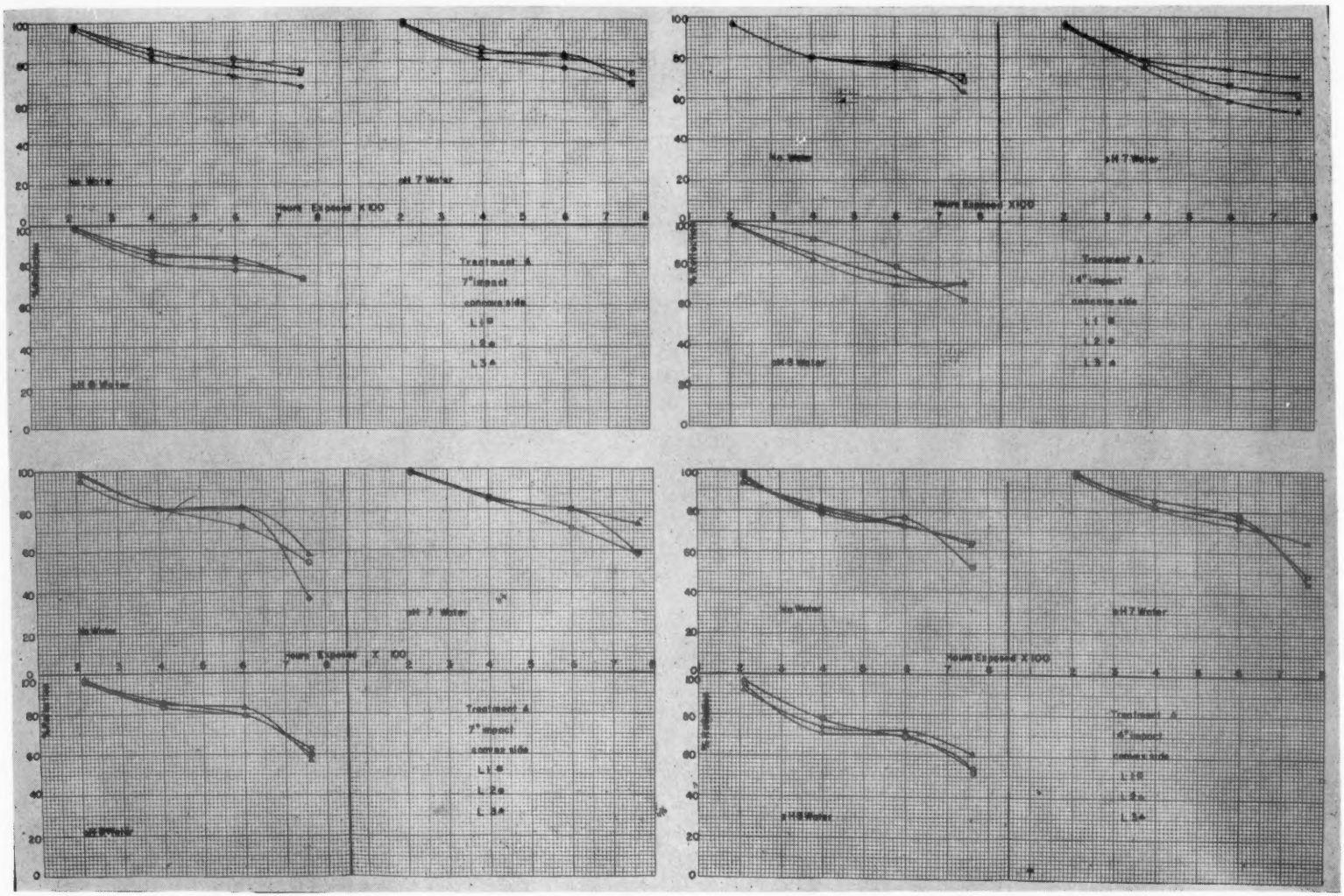


Figure 17. Treatment A with 7″ and 14″ impact

Changes in the reflectance values on the electrographic prints during the salt-fog exposure, comparing the area without impact with convex and with concave impact area. (Plotted % of reflectance versus time, up to 800 hours of salt-fog exposure)

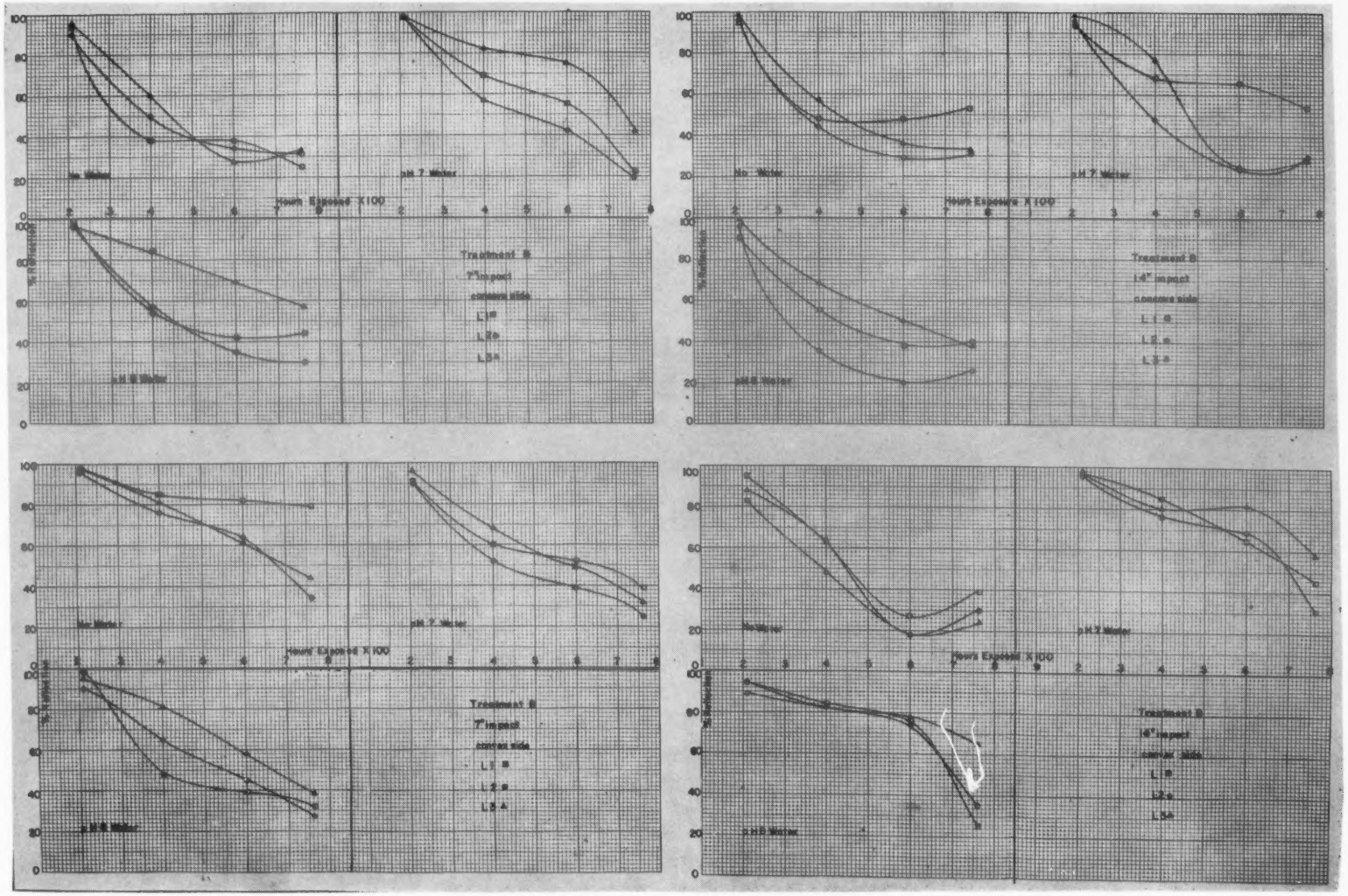


Figure 18. Treatment B with 7″ and 14″ impact

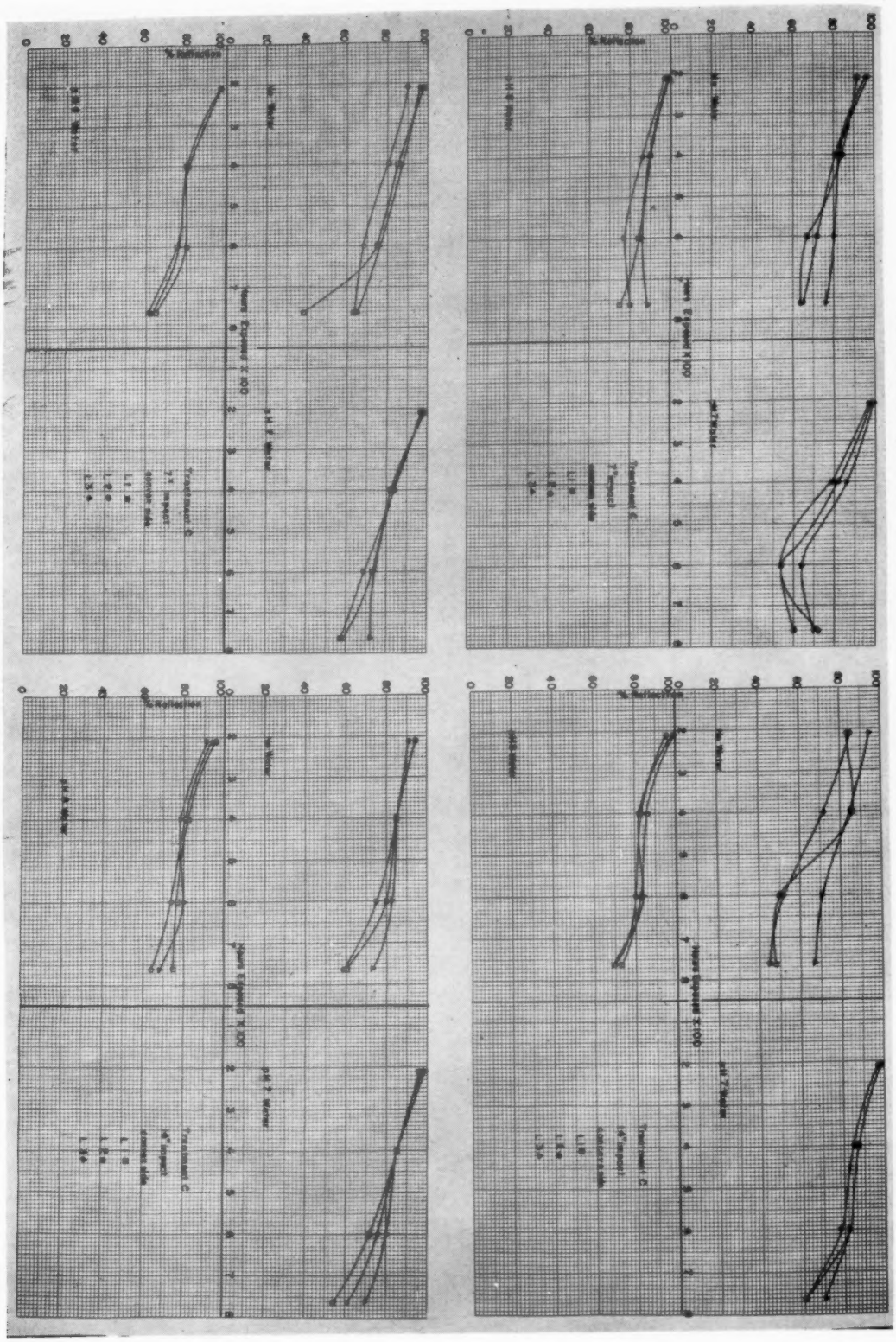


Figure 19. Treatment C with 7" and 14" impact

Changes in the reflectance values on the electrographic prints during the salt-fog exposure, comparing the area without impact with convex and with concave impact area. (Plotted % of reflectance versus time, up to 800 hours of salt-fog exposure)

Changes in the reflectance values on the electrographic prints during the salt-fog exposure, comparing the area without impact with convex and with concave impact area. (Plotted % of reflectance versus time, up to 800 hours of salt-fog exposure)

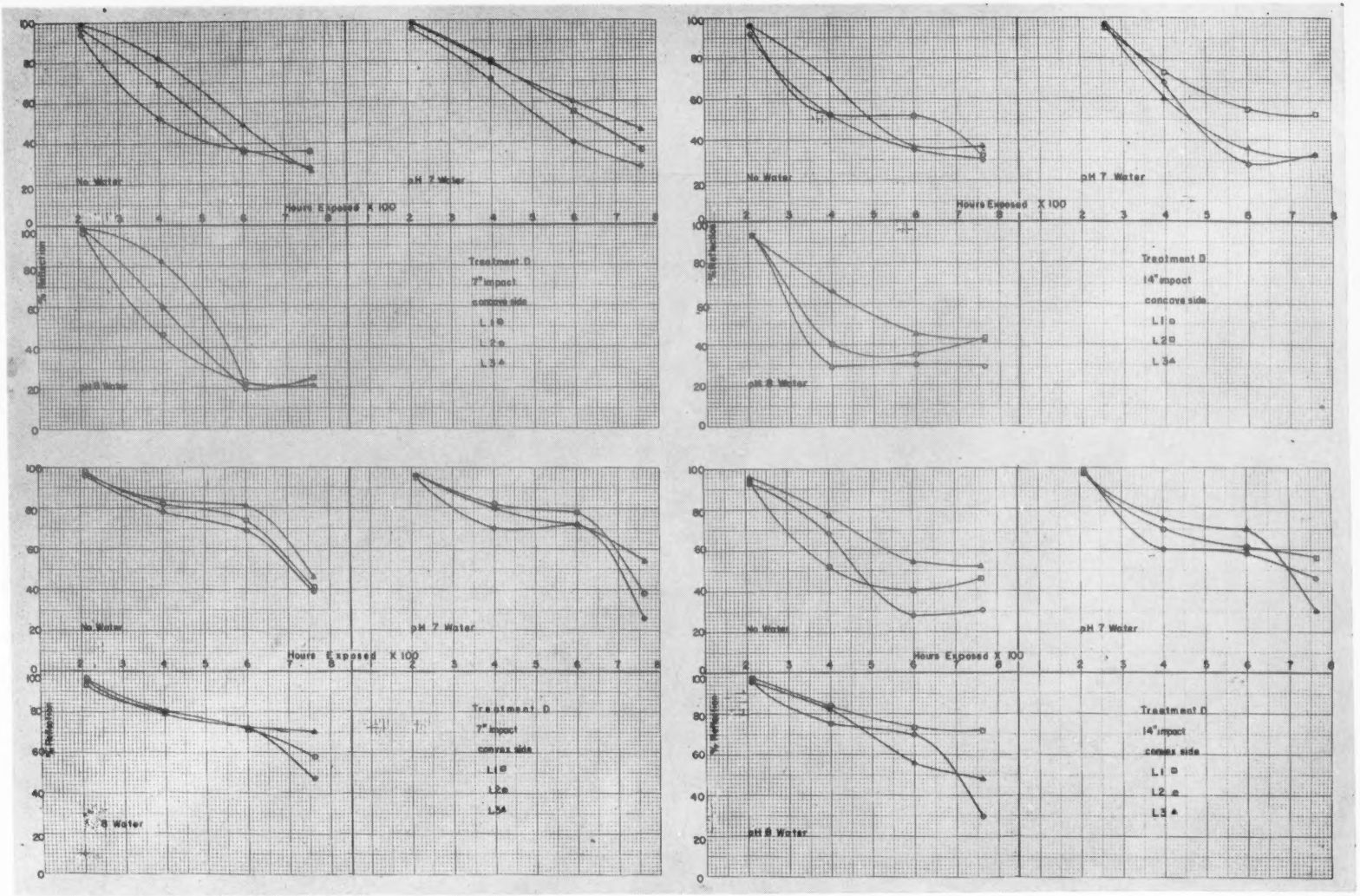


Figure 20. Treatment D with 7″ and 14″ impact

One group of measurements studied the change in reflectance of the prints with the center of the search unit set on the center of the test cross (indicated in Figures 3 to 6 by the points shown as small circles and referred to as Location 2.) A second group of measurements was made setting the center of the search unit on the upper or unpainted impact center (indicated by small squares as Location No. 1.) The third group in each series had the search unit centered on the lower or painted impact center (indicated by small triangles as Location No. 3.)

Inspection of Figures 17 to 20 shows that the electrographic prints for the concave sides of the 7-inch impact tested panels which had Phosphate Treatment A suffered comparatively little reduction in total reflection at each of the above three locations, and for each of the three conditions of rinsing, up to nearly 800 hours of exposure to salt fog. The convex sides of the same panels, however, show a marked decrease of total reflectance, indicating more severe corrosion during the same test period. The 14-inch impact tested panels for Treatment A show roughly the same general reflectance pattern, although the actual rate of corrosion is higher than for the 7-inch impact tested panels, thus resulting in decreased reflectance upon continued exposure to salt-fog, which would be anticipated from the greater severity of the 14-inch impact test.

The similarity of the curves for Treatments A and C is surprisingly close, a fact worthy of note, since Treatment A is a zinc phosphate of about 150 mg./sq. ft. coating weight, and Treatment C is an iron phosphate of about 68 mg./sq.ft. coating weight. Compared with the above curves, the reflectance curves for the lower coating weight iron phosphate Treatments B and D, which are in the range of 25-35 mg./sq. ft., show clearly a much higher rate of discoloration, and hence of corrosion.

In all cases, including the low phosphate coating weight systems, the drop in reflectance is usually greater at the test cross (panel location No. 2) than at either of the impact areas, thus indicating a relatively good impact resistance. At the impact areas themselves, panel location No. 3, which was impacted after application of paint, does not discolor or corrode as quickly as panel location No. 1, which was impacted after phosphating but before painting.

The above conclusions, obtained independently from Figures 3 to 6, are the same as those obtained by visual inspection of the exposed steel panels themselves or the corresponding electographic prints, thus demonstrating the equivalence of the methods. The reflectance method, however, has the additional advantage in that it tends to be more impartial, because it involves the use of instrumental measurements to assign performance ratings.

Effect of Pre-Treatment Type and Water Immersion:

Using the electrographic print method as a basis of comparison, one can see from an inspection of the impacted steel panels before exposure to salt-fog, that the zinc phosphate pre-treatment, type A, differed significantly from the three iron phosphate pre-treatments, types B, C, and D, in the initial resistance to impact. Although this difference is accentuated in the series of panels exposed to 14 inch impact as compared to 7 inch impact, the pattern is the same for all panels. The same general behavior of phosphate pre-treatment type was observed, moreover, for those panels which had been immersed for one minute in hot water (80 degrees C.) at a pH of 7 and a pH of 8, as well as the control panels which had no hot water exposure after phosphate pre-treatment, prior to paint application. It may be tentatively concluded, therefore, that one minute water immersion, as described under Section 5 above, does not materially affect the impact resistance of the phosphate pre-treated panels before exposure to salt-fog.

The same conclusions were also obtained from a statistical analysis of the data according to the method of Brownlee (4),

Panel Number (a)	Pre-Treatment Type (b)	Hot Water Exposure (c)	Impact Weight Inches	Average Condition at Point of Impact (I), and General Condition (G) of Panels (including impact damage), After Various Salt Fog Exposure Times (d)(e)(f)											
				0 Hrs.		210 Hrs.		407 Hrs.		596 Hrs.		763 Hrs.		906 Hrs.	
				I	G	I	G	I	G	I	G	I	G	I	G
Fl-6b-8	A	none	7	3	2	4	2	6	4	6	5	7	7	7	7
-65-8	B	"	7	3	2	3	2	6	4	9	10	10	10	-	-
-66-8	C	"	7	3	2	4	2	6	4	6	5	7	8	10	10
-67-8	D	"	7	2	2	3	2	6	4	6	6	10	10	-	-
Fl-6b-11	A	pH 7	7	6	2	6	2	6	3	6	4	8	6	8	7
-65-11	B	7	7	4	2	6	2	10	5	10	10	10	10	-	-
-66-11	C	7	7	4	2	4	2	6	3	7	4	8	6	9	9
-67-11	D	7	7	2	2	4	2	8	5	9	6	10	10	-	-
Fl-6b-14	A	pH 8	7	5	2	5	2	6	3	6	5	9	7	10	8
-65-14	B	8	7	4	2	5	3	9	7	10	10	10	10	-	-
-66-14	C	8	7	2	2	4	2	5	3	6	5	8	6	10	9
-67-14	D	8	7	2	2	4	2	5	3	8	6	9	9	10	9
Fl-6b-9	A	none	14	8	2	8	2	8	3	8	5	8	6	9	9
-65-9	B	"	14	4	2	6	2	10	7	10	10	10	10	-	-
-66-14	C	"	14	5	2	6	2	6	2	6	3	8	5	9	9
-67-14	D	"	14	4	2	4	2	6	6	10	10	10	10	-	-
Fl-6b-12	A	pH 7	14	8	2	8	2	8	3	8	5	8	8	9	9
-65-12	B	7	14	6	2	6	2	8	4	9	6	10	10	-	-
-66-12	C	7	14	3	2	6	2	6	3	8	5	8	7	9	8
-67-12	D	7	14	2	2	4	2	8	6	10	9	10	10	-	-
Fl-6b-15	A	pH 8	14	8	2	8	2	8	4	8	5	8	5	9	7
-65-15	B	8	14	6	2	6	2	6	2	8	4	10	10	-	-
-66-15	C	8	14	6	2	6	2	6	2	6	3	6	4	7	6
-67-15	D	8	14	4	2	6	2	8	5	10	7	10	9	-	-

Footnotes:
(a) Identifications such as Fl-6b-8 refer in turn to: Notebook No.(Fl)-Page No.(6b)-Panel No.(8).
(b) See Table I and text for description of pre-treatment type.
(c) Exposure to hot water of designated pH at 80°C., except for unexposed control panels.
(d) All ratings made on electrographic prints only.
(e) See text for ho - to ratings.
(f) Numbers from 1 to 10 refer to individual ratings for impact points (I), and for general panel condition (G). Impact damage taken into account and considered in general ratings. Low numbers indicate better condition.

Table V. Convex side salt-fog exposure of impacted, phosphate pre-treated, painted steel panels

Panel Number (a)	Pre-Treatment Type (b)	Hot Water Exposure (c)	Impact Weight Inches	Average Condition at Point of Impact (I), and General Condition (including impact damage) (G), of Panels After Various Salt Fog Exposure Times. (d)(e)(f)											
				0 Hrs.		210 Hrs.		407 Hrs.		596 Hrs.		763 Hrs.		906 Hrs.	
				I	G	I	G	I	G	I	G	I	G	I	G
Fl-6b-8	A	none	7	0	0	0	1	0	2	0	5	0	6	2	6
-65-8	B	"	7	0	0	2	3	8	10	10	10	10	10	-	-
-66-8	C	"	7	0	1	1	1	2	2	9	7	9	7	9	9
-67-8	D	"	7	0	0	1	1	4	8	10	10	10	10	-	-
Fl-6b-11	A	pH 7	7	0	0	0	0	2	1	4	4	6	7	7	9
-65-11	B	7	7	0	0	0	0	1	7	2	9	4	10	-	-
-66-11	C	7	7	0	0	0	0	2	2	6	8	6	8	7	9
-67-11	D	7	7	0	0	0	0	2	8	6	9	10	10	-	-
Fl-6b-14	A	pH 8	7	0	0	0	0	0	1	2	2	4	4	4	5
-65-14	B	8	7	0	0	0	1	1	7	10	9	10	10	-	-
-66-14	C	8	7	0	0	0	0	1	1	2	2	4	4	10	8
-67-14	D	8	7	0	0	3	2	4	8	10	10	10	10	-	-
Fl-6b-9	A	none	14	0	0	2	2	6	3	9	5	9	7	9	9
-65-9	B	"	14	0	0	2	2	10	10	10	10	10	10	-	-
-66-9	C	"	14	0	0	1	2	4	5	10	9	10	8	10	9
-67-9	D	"	14	0	0	2	2	8	8	10	10	10	10	-	-
Fl-6b-13	A	pH 7	14	0	0	2	2	6	4	10	8	9	8	10	9
-65-13	B	7	14	0	0	1	1	3	7	8	10	10	10	-	-
-66-12	C	7	14	0	0	0	0	2	1	2	3	2	6	5	8
-67-12	D	7	14	0	0	3	2	9	7	10	10	10	10	-	-
Fl-6b-15	A	pH 8	14	0	0	1	0	5	4	5	6	8	7	10	9
-65-15	B	8	14	0	0	4	3	10	10	10	10	10	10	-	-
-66-15	C	8	14	0	0	0	1	4	5	4	4	8	6	10	9
-67-15	D	8	14	4	2	5	4	10	10	10	10	10	10	-	-

For Footnotes - See Table V.

Table VI. Concave side salt-fog exposure of impacted, phosphate pre-treated, painted steel panels

as shown in Tables VIII and IX. From this analysis of variance it is concluded that at the 1% probability level (999 times out of 1000):

(a) One minute water immersion under the above conditions is without effect, and
(b) there is a significant difference in the initial behavior of the four phosphate pre-treatments to impact.

The electrographic prints confirmed the fact that phosphate pre-treatment type A has less initial impact resistance, particularly to a fourteen inch fall of the hammer.

Salt-Fog Exposure:

The impact tests being completed, it was decided to expose the tested panels to a salt spray, consisting of a solution of

Panel Designation (b)	Pl-64-7		Pl-65-7		Pl-66-7		AS-X-1		AS-X-2		Pl-67-7	
Pre-Treatment Type (c)	A		B		C		C		C		D	
Original Panel Weight- grams.	153.4438		153.1067		150.0279		162.0236		147.3978		151.1510	
Weight Change in milligrams, After Water Immersion (f)	Wt. Loss	Wt. Gain	Wt. Loss	Wt. Gain	Wt. Loss	Wt. Gain	Wt. Loss	Wt. Gain	Wt. Loss	Wt. Gain	Wt. Loss	Wt. Gain
After 1 minute	18	0	2	0	14	0	8	0	14	0	10	0
After 5 minutes	0	5	0	0	0	5	1	0	0	7	0	10
After 10 minutes	0	0	0	9	25	0	0	10	0	17	0	3
After 30 minutes	0	10	0	6	0	0	5	0	22	0	0	24
After 60 minutes	0	23	0	20	0	0	15	0	30	0	0	16
Net Weight Gain or Loss (d) After 60 minutes Milligrams	+20		+33		-24		-19		-56		+43	
Rust Appearance (e)												
Slight	1 min.		5 min.		10 min.		10 min.		10 min.		5 min.	
Severe	30 min.		10 min.		-		-		-		30 min.	

Footnotes: (a) Hot water temperature 75 to 80° C., pH approximately 7.
(b) Panel designations such as Pl-64-7 refer in turn to: Notebook No. (Pl)-Page No.(64)-Panel No.(7).
(c) See Table I and text for description of pre-treatment types.
(d) + sign indicates weight gain; - sign indicates weight loss.
(e) The times listed refer to the visual appearance of slight and severe rusting respectively, of the phosphate pre-treated panels. Other sets of panels, not listed here, all showed very severe rusting after exposure to cold water for one hour, followed immediately by exposure to hot water at a pH of approximately 7.
(f) The figures in each column indicate the weight gain or loss from one time interval to the next.

Table VII. Effect of water immersion on phosphate pre-treated steel panels

10 weight percent sodium chloride at 80 to 85 degrees Fahrenheit. Prior to this exposure, however, the unpainted portions of the phosphate pre-treated, impacted panels were dip-coated with the same paint used for the previously painted surfaces, in order to prevent the rapid deterioration of the panels, and such spreading under the paint as might have occurred. In this manner it became possible to assess to some extent the salt-fog damage to a panel which had been impacted before painting, in comparison to one impacted after painting.

All panels were exposed to the mist from the 10% salt solution in a salt-fog chamber (1). At approximately 200 hour intervals the panels were removed from the salt-fog chamber for examination. Electrographic prints were made at the end of 210, 407, 596, 763, and 906 hours exposure, using the technique described earlier. All of the electrographic prints were rated simultaneously, the results being tabulated for reference in Tables V and VI.

TEST RESULTS

The following discussion of the test results has been divided broadly into two groups, viz.: (I) Observations prior to salt-fog exposure, and (II) Observations during and after salt-fog exposure.

I. After Impact Testing, But Prior to Salt-Fog Exposure:

A. The fact has already been mentioned that the convex sides of the painted portions of the impacted panels were more severely damaged than the concave sides. This result might be anticipated from the observations that considerable stretching of the phosphate and paint films occurred on the convex sides at the points of impact, whereas on the concave sides less extension was experienced, except at the rims of the craters where sharp bending occurred.

B. Although no visible damage to the unpainted, phosphate pre-treated coatings was apparent to the naked eye, microcracks unquestionably were formed, especially on the convex sides at the points of impact. After paint was applied to these impact points and electrographic prints were taken, however, it was possible to distinguish the point of impact on the print in a number of cases.

C. Generally, no significant effect due to the one minute exposure to hot water at 80 degrees Centigrade, either at a pH of 7 or a pH of 8, prior to painting the phosphate pre-treated panels was observed. It must be pointed out, however, that the effects of hot water exposure at 75 to 80 degrees Centigrade on the various phosphate pre-treatments were different when the time of exposure was increased. As may be seen from Table VII, the weight changes and progressive rusting at successive immersion time intervals were different for the four phosphate pre-treating compounds. Since pre-treatment Type C showed a different trend than the other types, this test was repeated at a different time, with a fresh solution, and by a different operator. The results are shown as Panels AS-X-1 and -2 in Table VII. The agreement with the earlier test, Pl-66-7, is quite evident. This disparity in behavior might possibly result from differences in the water absorption characteristics of the various coatings. This effect, therefore, is also being investigated currently.

Another method of measuring the effect of water immersion of phosphate pre-treated steel panels, which was reported earlier by this research group (2), is based upon the change in electrical conductivity which occurs when a test panel is immersed in distilled water.

D. It was observed earlier that the zinc phosphate pre-treatment Type A had less initial impact resistance than the iron phosphate pre-treatments, Types B, C, and D. The relatively greater initial impact damage to Type A, appeared for instance in the electrographic prints for 14 inch impact at zero hours of salt-fog exposure. Nevertheless, it should be

EFFECT OF PHOSPHATE PRE-TREATMENT TYPE AND HOT WATER IMMERSION ON IMPACTED STEEL PANELS.
ANALYSIS OF VARIANCE TABLES FOR 7-INCH IMPACT - CONVEX SIDES (a)(b)(c) - VISUALLY RATED.

Phosphate Pre-treatment Type(d)	A	B	C	D	Totals
Hot Water Treatment(e)					
Controls-No Hot Water Exposure	8	3	3	2	16
Hot Water pH 7	7	3	3	2	15
Hot Water pH 8	6	4	4	2	16
TOTALS	21	10	10	6	47

I. Sum of Squares of Individuals = 229.00
II. Sum of Squares of Row Totals ÷ 4 = 184.25
III. Sum of Squares of Column Totals ÷ 3 = 225.67
IV. Square of Grand Total ÷ 12 = 184.083

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	
Between Rows (Water Treatments)	0.167	3	0.056	(II)-(IV)
Between Columns (Pre-Treatments)	41.584	2	20.124	(III)-(IV)
Residual	3.166	6	0.5277	
TOTAL	44.917	11		(I)-(IV)

TEST OF VARIANCE RATIOS:

Water Treatments:

Calculated Variance Ratio, Between Rows (Water Treatments) = 0.056 ÷ 0.527 = 0.106
Critical Variance Ratio, at 3 & 6 Degrees of Freedom & 1% Probability (f) = 9.8

Phosphate Pre-Treatments:

Calculated Variance Ratio, Between Columns (Phosphate Pre-Treatments) = $\frac{20.124}{0.5277}$ = 46.7

Critical Variance Ratio, at 2 & 6 Degrees of Freedom & 1% Probability (f) = 10.9

CONCLUSIONS:

1. Effect of hot water exposure under conditions of test are not statistically significant at the 1% probability level (99 times out of 100), since critical variance ratio is not exceeded - See Water Treatments, above.
2. There is a statistically significant effect of phosphate pre-treatment type on initial impact resistance of the steel panels at the 1% probability level, since the critical variance ratio is exceeded - See "Phosphate Pre-Treatments", above.

(a) Analysis of variance according to the method of Brownlee (4).
(b) Based on visual ratings of damage to convex sides of seven-inch Gardner impacted steel panels, after phosphate pre-treatment, hot water exposure, and painting, but prior to salt-fog exposure.
(c) See text, section 7, for explanation of significance of the numbered ratings used in this analysis. Low numbers indicate better condition.
(d) See Table I for description of phosphate pre-treatments.
(e) Exposure to hot water at 80° C. for one minute—see text.
(f) See Brownlee (Reference 4), pp. 184-5.

Table VIII. Effect of phosphate pre-treatment type and hot water immersion on impacted steel panels: Analysis of variance for 7-inch impact — convex side — visual ratings

EFFECT OF PHOSPHATE PRE-TREATMENT TYPE AND HOT WATER IMMERSION ON IMPACTED STEEL PANELS
ANALYSIS OF VARIANCE TABLES FOR 14-INCH IMPACT - CONVEX SIDES (a)(b)(c) -electrographically rated

Phosphate Pre-Treatment Type(d)	A	B	C	D	Totals
Hot Water Treatment(e)					
Controls - No Hot Water Exposure	8	4	4	2	18
Hot Water pH 7	6	4	6	4	20
Hot Water pH 8	6	4	2	1	13
TOTALS	20	12	12	7	51

I. Sum of Squares of Individuals = 261.000
II. Sum of Squares of Row Totals ÷ 4 = 223.250
III. Sum of Squares of Column Totals ÷ 3 = 245.667
IV. Square of Grand Total ÷ 12 = 216.750

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square
Between Rows (Water Treatments) (II)-(IV)	6.500	3	2.167
Between Columns (Pre-Treatments) (III)-(IV)	28.917	2	14.4585
Residual	8.833	6	1.4722
TOTAL (I)-(IV)	44.250	11	

TEST OF VARIANCE RATIOS:

A. Water Treatments:
Calculated variance ratio between rows (Water Treatments)= 2.167 ÷ 1.4722 = 1.472
Critical variance ratio, at 3 & 6 Degrees of Freedom & 1% Probability (f) = 9.8

B. Phosphate Pre-Treatments
Calculated variance ratio between columns (Pre-treatments)= 14.4585 ÷ 1.4722 = 9.821
Critical variance ratio, at 2 & 6 Degrees of Freedom & 1% Probability (f) = 10.9
Critical variance ratio, at 2 & 6 Degrees of Freedom & 5% Probability (f) = 5.1

CONCLUSIONS:

1. Effect of hot water exposure under conditions of test are not statistically significant at the 1% probability level (99 time out of 100), since critical variance ratio is not exceeded - see "Water Treatments", above.
2. There is a statistically significant effect of phosphate pre-treatment type on initial impact re-sistance of the steel panels at the 5% probability level (95 times out of 100), since the critical variance ratio at this probability level is exceeded. Since the 1% (99 times out of 100) probability level critical variance ratio is not exceeded, the evidence for a real difference in effect of phosphate pre-treatment is not quite as certain as it was in the case of the 7 inch impacted, visually rated panels - See Table VII

Footnotes:
(a) Analysis of variance according to the method of Brownlee (4).
(b) Based on ratings of electrographic prints of damage to convex sides of fourteen-inch impacted steel panels, after phosphate pre-treatment, hot water exposure, and painting, but prior to salt-fog exposure.
(c) See text, section 7, for explanation of significance of the numbered ratings used in this analysis. Low numbers indicate better condition.
(d) See Table I for description of phosphate pre-treatments.
(e) Exposure to hot water at 80°C. for one minute - see text.
(f) See Brownlee (Reference 4), pp. 184-5.

Table IX. Effect of phosphate pre-treatment type and hot water immersion on impacted steel panels: Analysis of variance for 14-inch impact — convex side — electrographic print ratings

emphasized that pre-treatment Type A also had a considerably higher coating weight than the other types, as listed in Table II. It is to be expected, therefore, that pre-treatment Type A would react in this manner, since the impact resistance of the thinner coatings would tend to be better than that of a thick coat.

E. In comparing the actual damage to the surface, one must also consider carefully the extent to which local damage affects the entire steel area by the spreading of moisture from the damaged area beneath the paint film. Thus, relatively minor local damage might be more serious on those coating systems which show large moisture spreading characteristics than greater initial local damage would be on coating systems which have a higher resistance to moisture spreading.

F. The observations listed in items C and D, above, were sustained by a statistical analysis of variance according to the methods of Brownlee (4), the results being statistically significant at better than the 1% probability level.

II. During and After Salt-Fog Exposure:

A. Confirming the conclusion in item C above, that one minute exposure to hot water at pH 7 or 8 had no appreciable effect, no specific differences in behavior of the panels attributable to the hot water immersion were observed throughout the salt-fog exposure.

B. In studying the effect of salt-fog exposure on the impacted areas, the moisture spreading from these points should be compared with the spreading from the test cross on the same panel. The use of electrographic prints presents the opportunity of measuring and recording any differences as shown in Figures 5-16. Their tabulation based on their change in reflectance is shown in Figure 17 to Figure 20.

C. At the end of 210 hours exposure to salt-fog, all panels were observed to be in good general condition. The initial damage at the point of impact, of course, represented an isolated point of film failure, but the spreading of damage from these points was not serious in most cases, as may be seen from Tables V and VI. Note that the general ratings of all panels take into account the initial impact damage, which is reflected in the poorer early general ratings for the convex sides as compared to the concave sides in the above tables.

D. As the salt-fog exposure continued, progressive failure of all films was noted. However, the rates of failure were strongly dependent upon the type of phosphate pre-treatment. Furthermore, as will be noted by inspection of the data in Tables V and VI, two of the pre-treatments, Types B and D, which exhibited good impact resistance before salt-fog treatment (See Table I and item D above) showed quicker failure after exposure to salt-fog. This behavior is precisely that which was emphasized in an earlier statement, vis., the spreading characteristics of the paint system are important In the present instance, panels having phosphate pre-treatment Types B and D, although superior to Type A in initial impact resistance, exhibited a greater spreading rate, both at the impact points and at the test crosses. The results of the salt-fog tests, therefore, bear out the general assumption postulated in item II-E of the test results listed above.

E. Up to about 600 hours of continuous salt-fog exposure, the original points of local film failure in the groups of panels having phosphate pre-treatment Types A and C showed only a minor extension of the failure area as compared to the panels having phosphate pre-treatment Types B and D. At the end of 763 hours, the panels having phosphate pre-treatment Types B and D had failed completely, whereas those panels

(*Turn to page 82*)

Edward C. Scholl *Staff pictures by Monroe Aller*

CONSULTANT TO THE PAINT INDUSTRY:

Esco Laboratories Specializes In Emulsion Coatings

The emulsion paint market should reach the 75 million gallon mark within the next five years. This is the prediction voiced by Edward C. Scholl, president of Esco Laboratories, State Highway 17, Hasbrouck Heights, New Jersey.

Mr. Scholl said that the technological efforts of both the raw material suppliers and the paint industry should be concentrated in the following areas in order to facilitate this rise in sales:

A. In the improvement of the adhesion of all types of emulsion coatings to previously painted surfaces, especially in exterior applications.

B. In the simplification of formulation techniques; both in the number of materials used and in manufacturing methods.

C. In the development of improved emulsion coatings for painting on wood surfaces.

D. The improvement of package stability with particular reference to freeze-thaw stability.

E. In the development of a gloss paint from an emulsion base.

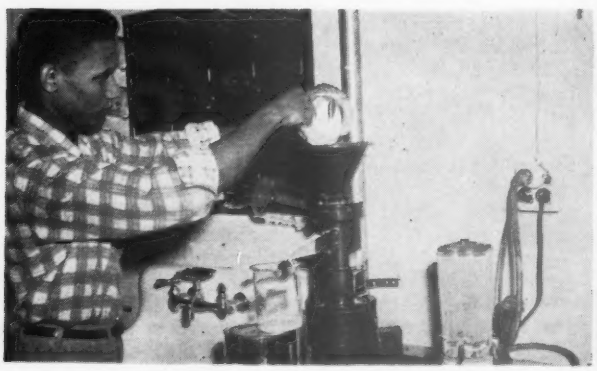
At present, the latexes used in the manufacture of emulsion paints are butadiene-styrene, polyvinyl acetates (homopolymers and copolymers), acrylic acid esters, vinyl chloride, vinylidene chloride and various acrylonitrile combinations.

In the next five years, Mr. Scholl asserted, new emulsion polymers will be available with properties which have been specifically designed for emulsion paints.

Mr. Scholl, who founded Esco Laboratories in 1952, as a consulting firm to the paint industry, covers all phases of the coatings field—with emulsion coating as his specialty. His 3,000 square foot laboratory houses the latest equipment for the production, testing and examination of all types of coatings.

The laboratory's chief functions are the development of end uses of raw materials in the coatings field; the development of formulas, production methods, and control procedures for coating manufacture; the evaluation of all types of coatings against specifications.

Prior to opening his own business, Mr. Scholl was technical director for the Muralo Paint Co., Staten Island, N. Y. He is a member of the New York Paint, Varnish and Lacquer Association and the American Association of Consulting Chemists and Chemical Engineers. He has been associated with the paint industry since he turned down a St. Louis Cardinal baseball contract when he graduated from college some 20 years ago.

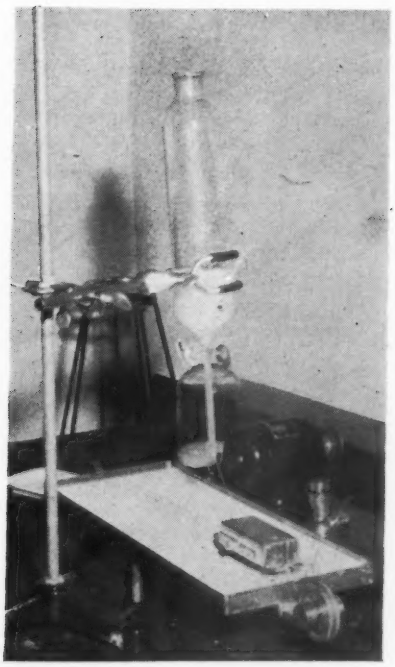


Latex paint is ground in a laboratory Morehouse mill by Leon Gilchrist, laboratory assistant.

Laboratory assistant Ronald Spitzer performs gloss determinations of a latex paint.

Reflectometer determinations are made of latex paints test panel.

Washability test: Lab assistant brushes out panel.



Test determines washability characteristics of a latex panel.

Claude Smith, left, of T. F. Washburn Co. and Ed Scholl discuss formulation problems of paint systems.

NEWS

Fred'k Daniel Addresses N. Y. Production Club

Frederick Daniel, head of the Daniel Products Co. and an affiliate of the Daniel-Litter Laboratories, was guest speaker at the Mar. 1 meeting of the New York Paint and Varnish Production Club.

Fred Daniel

Speaking on "The Influence of Solvents on Pigment Dispersions and Seeding," Mr. Daniel discussed the "seeding" or "pigment shock" phenomena which often accompany dispersions made with the low vehicle solids technique.

Mr. Daniel is the author of numerous technical papers and holds many U. S. Patents.

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Five Talks Presented At Wetting Agent Seminar

Five papers were presented at the Louisville Production Club's Wetting Agent Seminar held March 11 and 12 in Louisville.

The following papers were presented:

"Theoretical Background—and Classification of Agents," Dr. G. M. Gantz, Antara Chemical, New York City; "Where to Use Each Type of Surfactant," Dr. George L. Brown, Rohm & Haas, Philadelphia; "Hydrophylic and Lypophylic Balance," presented by Atlas Powder Co., Wilmington, Del.; "Behavior of Surfactants in Films," Francis J. Leonard, Nopco Chemical Co., Harrison, N. J.; "Wetting Agents in Solvent Systems," Ira Bingham, Synthetic Chemicals, Paterson, N. J.

•

Du Pont Isocyanates

The Du Pont Co. has announced that its new isocyanates plant, geared to manufacture 25,000,000 pounds a year, is now in production. The new plant is at the company's Chambers Works at Deepwater Point, N. J.

Dr. James Conant Chosen To Receive High ACS Award

Dr. James Bryant Conant, the chemist who became president of Harvard University and is now American Ambassador to the Federal Republic of Germany, has been chosen to receive the American Chemical Society's Charles Lathrop Parsons Award for outstanding public service. The announcement was made by Dr. Ralph A. Connor, chairman of the Society's board of directors.

Dr. Conant is the second recipient of the award, which was established in 1952, to recognize and encourage public service activities by chemists and chemical engineers.

The award, which cannot be given more frequently than once every three years, consists of a scroll and the privilege of choosing the recipient of a $2,000 scholarship for graduate study in chemistry, chemical engineering or some related field. Presentation of the award to Dr. Conant will be made at a ceremony in Columbus, Ohio, during a meeting of the ACS board there next June, according to Dr. Connor, who is vice-president for research of Rohm and Haas.

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M. McAnerney New Pres. Of Wet Ground Mica Ass'n

Marshall McAnerney, sales manager of the Richmond Mica Corp., New York, was elected president of the Wet Ground Mica Association, Inc. at the Association's recent annual meeting.

Elizabeth Clarkson, vice president of Stewart N. Clarkson Associates, Inc., was re-elected secretary-treasurer.

The Association voted to continue its research program on the use of wet ground mica in paint under the direction of Dr. Max Kronstein at New York University. Technical Bulletins based on the results of this research program are available as a service to the paint industry and may be obtained from the Wet Ground Mica Association, Inc., 420 Lexington Ave., New York 17, N. Y.

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Aromatic Relocates

Aromatic Products, Inc. has moved its offices and laboratory from 15 E. 30 St., New York to new and larger quarters at 235 Fourth Ave., New York 3.

Dr. Wm. von Fischer To Join the Glidden Company

Dr. William von Fischer, for the past eight years head of the department of chemistry and chemical engineering at Case Institute of Technology, has been appointed coordinator of research and development for The Glidden Company.

Wm. von Fischer

Announcement of Dr. von Fischer's appointment was made by Dwight P. Joyce, Glidden chairman and president. The nationally-known chemist will assume his new position at the close of the present academic year.

Dr. von Fischer is the editor of "Paint and Varnish Technology" and co-editor of "Organic Protective Coatings." He is the author of numerous technical articles.

In 1940 he established a paint and varnish educational program at Case and both class and laboratory courses in the field have been offered by Institute since that time.

He is a member of numerous professional and honorary societies, among them the American Chemical Society, the American Institute of Chemical Engineers, the American Association for the Advancement of Science and the Society of Chemical Industries. He is a past chairman of the American Chemical Society's Committee on Chemical Education and a member of its Committee on Manpower.

In his new position, Dr. von Fischer will coordinate research and development activities of the Paint, Chemicals-Pigments-Metals, Durkee Famous Foods, Southern Chemical and Chemurgy divisions of The Glidden Company.

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Appoint John H. Calo Co.

L. W. Reeves, manager of chemical sales for The General Tire & Rubber Co., Akron, Ohio, has announced the appointment of the John H. Calo Co., Inc., 19 Rector St., New York 6, N. Y., as chemical sales agents for "Glen-Flo Paint Latex" to the paint manufacturing industry. Calo will cover metropolitan New York and the surrounding area.

Tailor-Made Package Service by Continental is bright, cheerful and obliging

Here at Continental, we've developed a special formula for keeping paint can customers happy. First, we offer containers that never let you down. Continental's exclusive "Tripletite" lid protects your paint by binding to metal at three points. Next, we deliver all the precision-made cans you need, at any time and place you set. And when you require engineering or research help, it's available in just the type and amount to fit your needs. Won't you try Continental's Tailor-Made Package Service? It's as fresh and cheerful as a new coat of paint.

"TRIPLETITE" lid binds metal to metal at three points — provides 50% increase in guard points against oxidation and messy paint skin.

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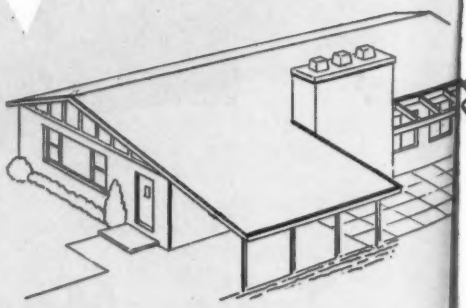
Pacific Division: Russ Building, San Francisco 4

TAILOR-MADE PACKAGE SERVICE

. . . for all Aqueous paints

PROTECTION

—against bacterial spoilage in the container



—against mildew attack on the applied paint

NUODEX PMA-15 newest in a line of famous fungicides

As a companion product for Super Ad-It®, leading mildewcide for oil, alkyd and oleoresinous finishes—Nuodex offers PMA-15 for aqueous systems.

Nuodex PMA-15 is a solubilized form of phenyl mercury acetate (25-25.5% concentration) containing 15-15.3% mercury as metal. Developed specifically for water-based interior and exterior finishes, it is economical and easy to use.

Nuodex PMA-15 may be used with a minimum of side effects on the finished paint.

Both laboratory and field experiences show that it . . . does not contribute to staining . . . will not cause pigment flocculation . . . has little or no effect on freeze-thaw stability (in some cases, resistance to freeze-thaw breakdown has been improved by Nuodex PMA-15) . . . does not cause latex coagulation when added to the paint.

Nuodex PMA-15 may be used in any of the standard aqueous systems, including butadiene styrene, polyvinyl acetate, and acrylic types.

We invite you to contact your Nuodex Representative —or to write us direct—for working samples and further data.

NUODEX

NUODEX PRODUCTS CO., INC., Elizabeth, N. J.

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LOSS OF DRY INHIBITORS
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Exkin® No. 1 and Exkin No. 2 for standard oil and alkyd paints
Exkin No. 3 for odorless systems

LATEX ADDITIVES
Cyclodex®—to accelerate curing, improve adhesion

STEARATES
Standard and Special Purpose Stearates

the ADM kaleidoscope

Published by
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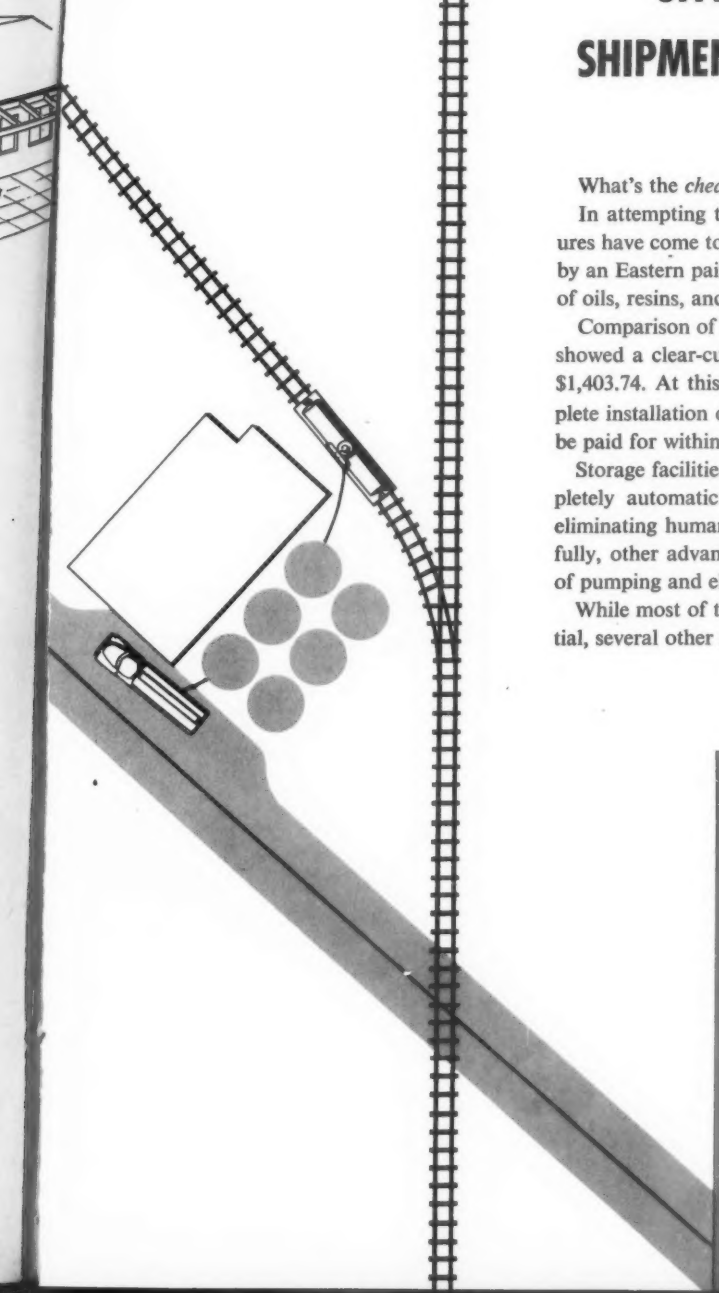
FEBRUARY—MARCH, 1956



How one paint manufacturer SAVED $1,430.74 WITH BULK SHIPMENTS OF OILS, RESINS, VEHICLES

By: Fred A. Carr
ADM Buffalo, New York

What's the *cheapest* distance between two points?

In attempting to find definite answers to this question, some interesting figures have come to light. Significant among these was a recent comparison made by an Eastern paint manufacturer between bulk shipments and drum shipments of oils, resins, and vehicles.

Comparison of two tank truck shipments with equivalent shipments of drums showed a clear-cut saving in favor of bulk shipping, storage, and handling of $1,403.74. At this rate, a company official estimates that the cost of the complete installation of bulk handling facilities which came to about $7,000.00 will be paid for within one year.

Storage facilities of the firm consist of six square tanks controlled by a completely automatic push-button system which comes as close as possible to eliminating human error at the mixer. After checking the new operation carefully, other advantages of bulk handling have become apparent such as speed of pumping and elimination of labor involved in handling drums.

While most of this was the result of saving the 1¾¢ per pound bulk differential, several other factors were important. These included:

(Continued Page 2).

Here's how one manufacturer saved $1,430.74

CAPACITY:	TANK TRUCK	TRUCK OF DR
Tank truck—4,000 gals.	31,000 lbs.	
Truckload of drums:		
73 drums or 4,015 gals.		31,11
Weight of drums @ 50 lbs.		3,65
Total weight	31,000 lbs.	34,76
SAVINGS:	**ONE DELIVERY**	**TW DELIV**
Bulk differential:		
31,000 lbs. x 1.75¢ per lb.	$542.50	$1,08
Freight on drums:		
3,650 lbs. @ 1¢ per lb.	36.50	7
Man hours for unloading:		
Truckload of drums 10 hours		
Tank truck 1½ hours		
Man hours saved per truck 8½ hours		
Dollar savings 8½ hrs. x $3.50	29.75	
Additional savings in handling within plant	106.62	2
TOTAL SAVINGS	$715.37	$1,4

Many of you know Bill Gove. He's been on our Northwoods Paint Clinic Program two years in a row and has been a featured speaker at many trade conventions.

In 1953 The National Sales Executives picked him "Salesman of the Year" and the St. Paul Advertising Club in 1954 named him "Sales Promotion Man of the Year."

Bill will present, via KALEIDOSCOPE, his "Easy to Buy From" series.

Bill's a pretty practical guy. He believes that if we become easier to live with—we just automatically become easier to buy from.

"Easy to buy from"

By Bill Gove

Over the years, I've had the pleasure of traveling with, and listening to, hundreds of salesmen. From these men I've picked up ideas. So when the ADM folks suggested that I pass 'em along to you via the *KALEIDOSCOPE*, I jumped at the chance.

I also attended five of your trade conventions during 1955, and I came away from all those meetings with one strong impression. I got the idea that everyone agreed that if we learn how to relax and enjoy our work, our days will be fuller—we'll feel better—and we'll sell more merchandise.

I'm sure we all agree that no two *successful* salesmen are alike. They're all different. They're neither tall nor short, fat nor thin, handsome nor homely, young nor old, dapper nor sloppy. They—the good salesmen, I mean—don't always sell the best products; they don't always make the most calls; they don't always have the advantage of the best sales training, the best methods, the best organization, or the best education. Sometimes they don't even make the most money.

No—there's no pattern—and there never will be—

But—

—There's one thing I've noticed—one thing that all good salesmen have in common that seems to be a part of their make up.

They are all—and this is the key to the whole series—they are all—*EASY TO BUY FROM!*

Now, there's nothing revolutionary about this idea of making it easy for the customer to buy. Fact is, our whole economy is geared to this principle. For example, take your modern super markets. They give you convenient parking, music, self-service, play areas for the kids, etc. They make things "easy to get", don't they?

And how about the folks who sell with credit. "Use it now," they say. "Pay later!" They're easy to buy from—too easy, at times, we must admit.

And have you had any direct mail lately. "Don't decide now," they shout. "Tear off the top of your neighborhood paint dealer—send him in *now*—don't delay—*send no money*—forget the postage. All you have to do is put an 'X' in the square marked 'Bill Me'—We'll take care of the rest!" Easy? You bet!

So the $64,000.00 question we are going to ask ourselves in these get-togethers is: Are we, as personal salesmen—who live or die depending on our ability to get the prospect or customer to say "Yes"—are we—*EASY TO BUY FROM?*

And, more important, we're going to kick around *together* ideas on how we can make ourselves—*EASY TO LIVE WITH—EASY TO BUY FROM*—but *NOT EASY TO GET ALONG WITHOUT.*

It ought to be fun—I'm looking forward to it!

Cont. from Page 1

. . . freight charges on the dead weight of drums totaling approximately 3,300 pounds on a 66 drum truckload.

. . . man hours saved based on a time study which showed almost 10 man hours required to unload a truckload of drums compared with an average of one and one-half hours for a tank truck.

. . . man hours eliminated for moving drums to warehouse and stenciling them with the manufacturer's code.

. . . additional man hours saved in transferring the liquids from storage to the mixing equipment. (Studies show that every drum taken into a plant is handled at least four times.)

Other advantages resulting from elimination of drums include the release of valuable space formerly used to store drums; no losses of undrained oil remaining in drums; and no pre-warming of drums in cold weather.

Bulk handling also improves housekeeping, and affords greater protection against fire, toxic fumes, personal injury, and other hazards.

A Source of New Profit

This and other similar experiences show that the installation of bulk handling and storage facilities for oils, vehicles, and resins actually *is the cheapest distance between two points*—between the supplier and the user. Or, to go even farther, as one paint manufacturer expressed it, "The dollar and cents savings offered by bulk handling presents us with the greatest opportunity to increase our return on our investment."

Other manufacturers have pointed out that being able to schedule their shipments from a single source enables them to take advantage of freight and quantity savings. By combining shipments of ADM resins, paint vehicles, fatty acids, plasticizers, linseed, soybean and marine oils, they have been able to use compartment tank trucks or tank cars to earn substantially lower rates.

Naturally, ADM with plants located on the east coast, in the middlewest, and on the west coast offers the manufacturer who buys in bulk many advantages in addition to fast service. Its line of paint liquids is the broadest in the industry including resins, paint vehicles, fatty acids, plasticizers, as well as linseed, soybean, and marine oils. This simplifies purchasing be-

One of the modern tank trucks in the ADM truck fleet. Insulated and steam-piped tanks are available for easy handling of resins and vehicles. Tanks are compartmented to permit the economies of combined shipment.

cause a manufacturer can buy and ship virtually all of his paint liquids in bulk combinations that result in fast inventory turnover.

Help Available from ADM

Information designed to help you plan your own bulk handling facilities is available in a special technical bulletin prepared by ADM. This bulletin contains helpful data on tanks, lines, pumps, unloading procedures and outlines general specifications for equipment and installation. These already have saved paint manufacturers time, money and expensive mistakes. In estimating the capacity of the tanks you will require, for example, the bulletin recommends that a manufacturer who uses 8,000 gallons per month of a single resin or vehicle install a 12,000 gallon tank. This will enable him to have about half a month's supply on hand and still receive a full tank car. Specific details on handling vehicles are included plus special tables to indicate temperatures required to give various vehicles the viscosities desired for easy pumping and flow. Paint makers considering installation of bulk handling facilities are invited to write for a free copy of Technical Bulletin No. 105 or to call on the ADM technical men for on-the-spot help.

All-New Portfolio Of Colorful Exteriors Proves Spring Sales Booster

Aimed at helping home owners discover that the *outside* of their homes can be just as distinctive, as cheerful and as inviting as living rooms or kitchens, this colorful booklet "Portfolio Of Colorful Exteriors" contains 40 well-planned, beautifully coordinated exterior color schemes. Available in two versions—with or without the Week-End Decorator logotype—Colorful Exteriors can be ordered in quantity at 7½¢ each f.o.b. Minneapolis plus imprinting. Write for a free sample copy today!

ADM maintains a fleet of 521 tank cars. These include aluminum tank cars for fatty acids, alcohols, and glycerines; special cars for caustic soda; insulated cars for resins; and specially coated cars for corrosive materials.

Technically Speaking . . .

SATIN FINISH FLOOR VARNISH. Formula provides for a relatively low cost flatting paste or a finished satin varnish which is very satisfactory for low quality flooring, for example, in tract houses. Approximate RMC of the paste is 14.5 cents per pound at 60.6% N.V., weighing 9.55 pounds per gallon. Approximate RMC of varnish runs $1.30 per gallon at 43.2% N.V. and 74 sec. viscosity. (Product 1-1)

CLEAR BRUSHING FLOOR LACQUER. Based on ½ second butyrate and Arochem 404 lacquer has withstood four months of testing in which it was walked on several hundred times a day. The formula can also be adapted to make a penetrating type lacquer by reducing to approximately 18% non-volatile with an equal mixture of isobutyl acetate and cellusolve acetate. (Product 1-2)

THIXOTROPIC SHINGLE STAIN. These stains have advantages of better hiding, ease of application, and one-coat versus multi-coat systems. ADM formula 613-11B. It will not run or shake off the brush, gives excellent brushability plus good durability, color retention, and one-coat coverage. (Product 1-3)

A MOISTURE-RESISTANT BRASS LACQUER. A clear, air dry, one-coat application to prevent tarnish of brass exposed to moisture. Offers definite superiority over nitrocellulose lacquers in this respect. Suitable for spray or dip. Based on ½ sec. butyrate and dewaxed Damar. (Product 1-4)

HIGHLY EFFICIENT LACQUER PLASTICIZER. Try Admex 710 for assured color stability in blonde lacquer finishes. The complete saturation of this product prevents yellowing and light discoloration, and assures outstanding flexibility retention. Complete compatibility with nitrocellulose. Excellent compatibility with ethyl cellulose and cellulose acetate butyrate. Particularly recommended for water white lacquer finishes. (Product 1-5)

Detailed information about any of the above products or formulations may be secured by filling out and mailing the coupon to ADM. Ideas from paint manufacturers for this column will be welcome.

ARCHER-DANIELS-MIDLAND COMPANY
700 Investors Building, Minneapolis 2, Minnesota

Please send me free information on:

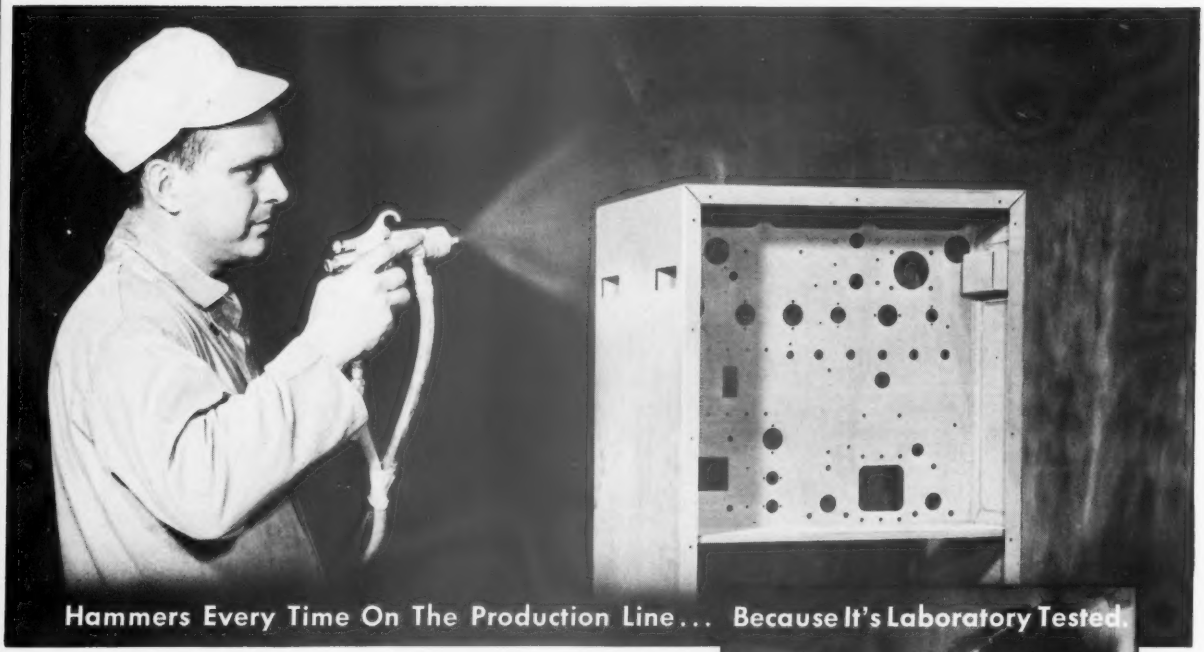
☐ Product 1-1 ☐ Product 1-4
☐ Product 1-2 ☐ Product 1-5
☐ Product 1-3

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



Hammers Every Time On The Production Line... Because It's Laboratory Tested.

WHY PRE-TESTED *Aropol 880* HAMMERS OUT SUPERIOR FINISHES

Uniformity is the key to good industrial finishes . . . especially for hammertones where patterns must be *like peas in a pod.*

To prevent snarls on the production line . . . to make certain that hammertone patterns match, ADM produces a superior, pre-tested copolymer resin. It's labeled Aropol 880.

In addition to passing rigid control tests, a sample from each batch of 880 is formulated into a hammertone finish. Panels are sprayed and checked against ADM standards before any batch is shipped. Hammer finishes properly formulated with Aropol 880 are tough, durable and have excellent color retention.

And there are other production line advantages of this fast drying copolymer resin. It has superior pigment and resin compatibility, good alkali resistance, excellent adhesion, maximum hardness and high gloss for standard industrial finishes, including specification MIL-E-10687.

Write today for a new packet of hammertone finishes made with Aropol 880. Included are six suggested formulations and a paint chip which demonstrates how you can make a uniform, lustrous metallic finish with Aropol 880. A neat trick since it permits production of two basic finishes from only one drum of paint.

SPECIFICATIONS

Acid Value (solids)	3-8
Color (Gard. '53)	8 max.
Viscosity (G-Holt @25°C.)	Z-Z_3
Per Cent Solids	60±1%
Av. Lbs. per Gal.	8.25

Archer-Daniels-Midland company

Archer QUALITY

Other ADM Products: **Linseed, Soybean and Marine Oils, Paint Vehicles, Synthetic and Natural Resins, Polyesters, Fatty Acids and Alcohols, Hydrogenated Glycerides, Sperm Oil, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa, Livestock and Poultry Feeds.**

ARCHER-DANIELS-MIDLAND COMPANY
787 Investors Building
Minneapolis 2, Minnesota

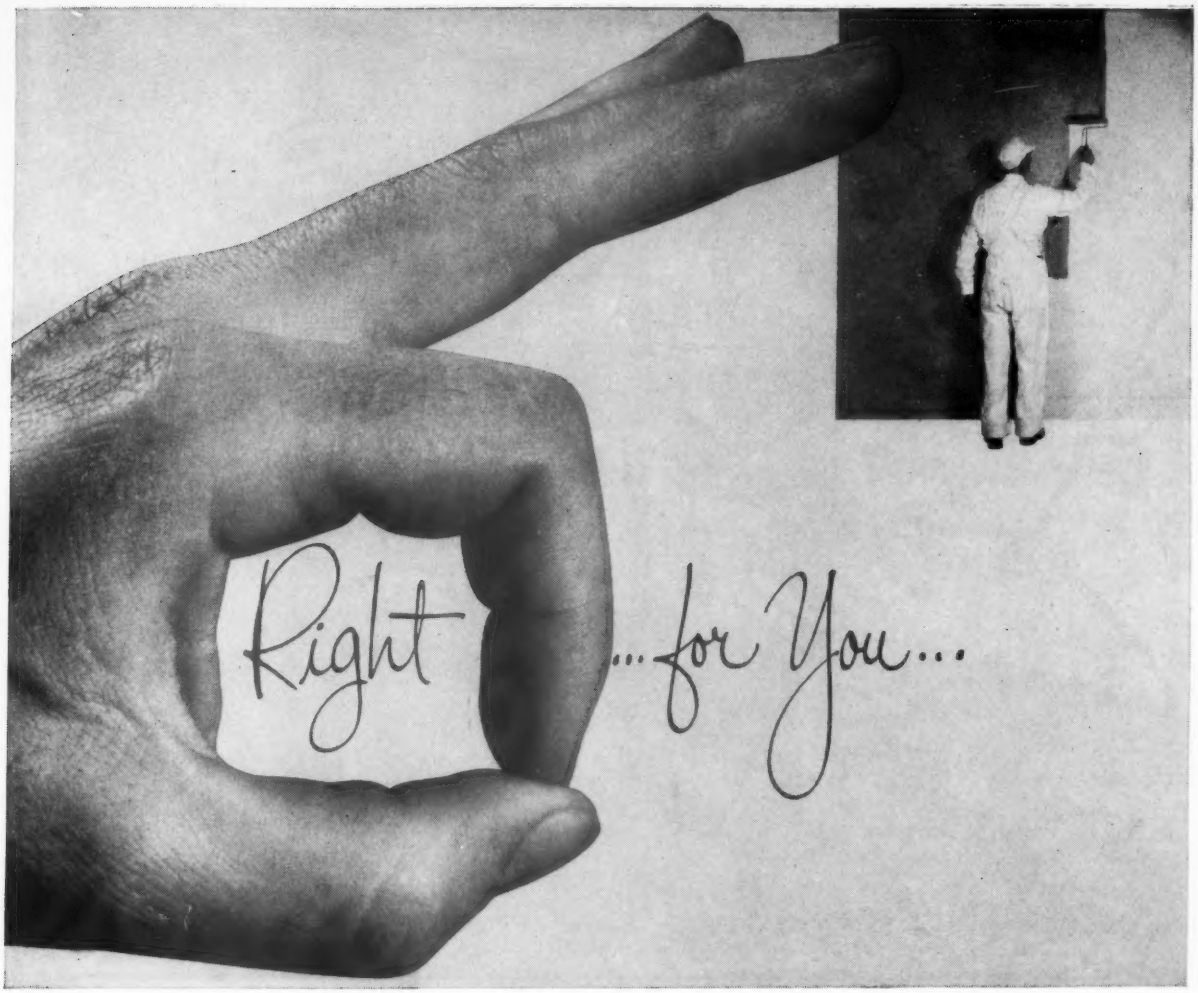
Yes, please send information on Aropol 880 for Hammer Finishes, including packet of paint chips.

Name_____

Company_____

Address_____

City_____ Zone____ State____



NIACET vinyl acetate monomer...

Brand

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CHEMICALS

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
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High Quality backed by the experience of the pioneer and leader in the field.

Speedy Shipments in any quantity to meet your needs from plants located at Niagara Falls, New York, and Texas City, Texas, and from bulk storage at Newark, New Jersey.

Increased Production that keeps pace with your expanding requirements —new units at Texas City will be on stream in 1956, more than doubling this plant's capacity.

For additional information, on how NIACET vinyl acetate monomer can help you make money, call or write the Carbide and Carbon office nearest you. Offices located in 26 principal cities. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

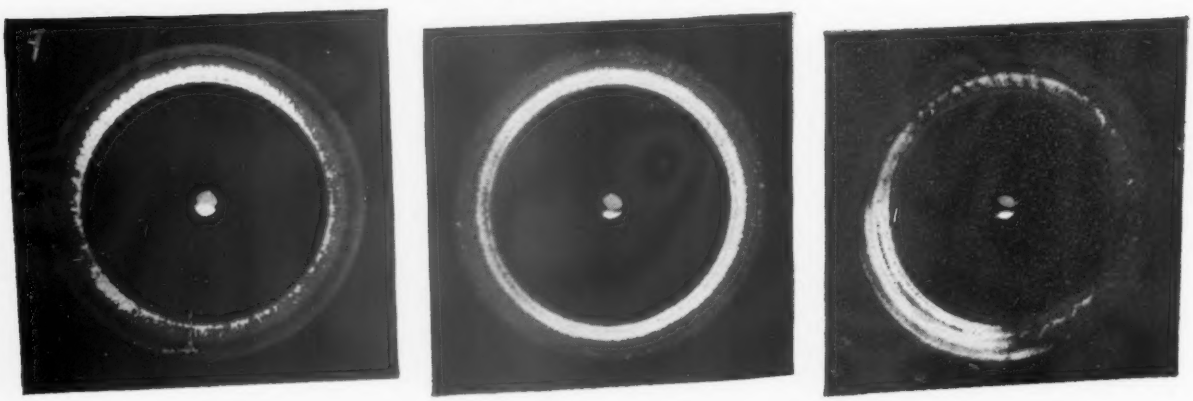
The term "Niacet" is a registered trade-mark of Union Carbide and Carbon Corporation.

more

You can get, and *hold*, a bigger share of the tremendous market for metal coatings by taking advantage of new coatings you can formulate with BAKELITE Vinyl Dispersion Resins. These organosol coatings are colorful, economical, and *tough*. In tests they show *ten times more abrasion resistance* than conventional baked-on coatings.

Take a look at this automobile instrument panel. It's textured for glareless safety. The wrinkle-finish organosol is sprayed on over a metal conditioner (also based on BAKELITE Vinyl Resins) bonding it fast to the metal. Baking at 350 deg. for 15 minutes fuses the surface coat into a continuous, tough film. Oil smudges, grease, dirt and water wipe off easily without a trace.

Whether for auto interiors, household appliances, machine housings, metal furniture, office machines or any metal surface ... with BAKELITE Vinyl Dispersion Resins you can formulate organosol coatings with the business-getting features of richer color and texture, and proven durability. Write Dept. LR-153 for booklets "Vinyl Dispersion Resin Coatings—Organosols and Plastisols" and "Vinyl Resin Solutions and Dispersions for Industrial Metal Protection."



abrasion resistance

with Organosol Metal Coatings formulated with BAKELITE Vinyl Dispersion Resins

BRAND

Wear Test Shows Superior Durability of the new wrinkle-finish coating at right. Below, after 4000 revolutions under a 17H emery wheel in standard Tabor Abrasion test, it shows little sign of wear. Standard types of coatings, shown at left, wore through to white metal primer in 528, 88, and 497 revolutions respectively.

BAKELITE
BRAND
RESINS for COATINGS

BAKELITE Vinyl, Polyethylene, Phenolic, and Epoxy Resins and Styrene and Vinyl Acetate Latexes for Coatings.

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

NEWS

West Coast Symposium Names Papers, Exhibits

Selection of the technical papers to be presented at the 1956 West Coast Symposium, to be held at the Hotel Statler, Los Angeles, March 22-24, has been announced by General Chairman Dan J. Heisler.

The evaluation of the papers submitted was made by the Symposium Committee under the direction of Joe Weber, chairman, and Dr. J. B. Callaway, vice president. The papers are as follows:

"Principles of Paint Testing," A. C. Elm, N. J. Zinc Co.

"Exposure Characteristics of Various Latices," Golden Gate Paint & Varnish Production Club Technical Committee. To be presented by R. Minucciani of W. P. Fuller & Company.

"Critical Pigment Volume Concentration Studies of PVA Paints," V. D. Howell, Celanese Corporation of America.

"New Developments in Emulsion Paints," DeFrance Clarke, Jr., Carbide and Carbon Chemical Co.

"Lacquer Primers, Surfacers, and Top Coats for Metals," Frank E. Piech and Wm. O. Bracken, Hercules Powder Co. To be presented by Mr. Bracken.

"The Color Calculator," Los Angeles Paint & Production Club Technical Committee. To be presented by Henry Cole of the Bradley Paint Co.

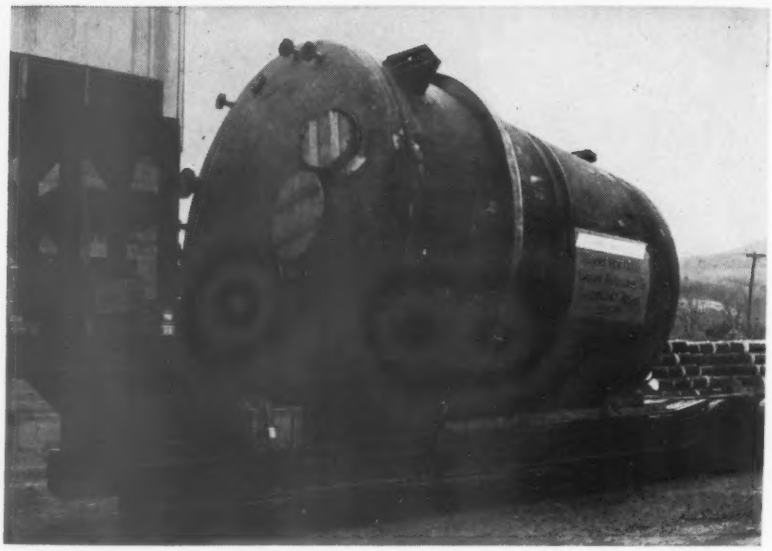
"Acrylic Emulsion and Solvent Type Paints," W. H. Graeff, Rohm & Haas.

"Isophthalic Alkyds," W. H. Wampner, Reichhold Chemical Co.

"Evaporation of Hydrocarbon Solvents from Alkyds," J. R. Scheibli and R. D. Harline, Shell Development & Co. To be presented by Mr. Harline.

"Rust Inhibitive Pigments," L. R. Sherman, Imperial Paper & Color Corp.

"Color and Critical PVC—A Complex Problem and a Simple Answer," Fred Steig, Titanium Pigments Corp.



GIANT AUTOCLAVE: This 8,000 gallons capacity autoclave—one of the largest, high grade units ever built—will be installed in one of Schenectady Resins Division's plants. Installation is part of over-all expansion program for increased production of terpene, alkyd, phenolic and other synthetic resins.

A Seminar and Open Forum on "Interior and Exterior Emulsion Paints" will be moderated by Dr. Reed Brantley of Occidental College. A panel of six raw material men and six chemists, all experts in their field, will answer questions submitted in advance by members of the Pacific Coast Production Club.

Following is a list of exhibitors and their booth numbers:

Advance Solvents & Chemical Co., 46; American Mineral Spirits Co., 10; Archer-Daniels-Midland Co., 39; Atlas Powder Co., 74, 75; Bakelite Co., 30, 31, 32, 33, 34; Baker Castor Oil Co., 45; Peter D. Bolley & Assoc., 85; Borden Co., 69; Braun Corp., 63; E. S. Browning Co., 65; Buckman Laboratories, Inc., 70; L. H. Butcher Co., 37; California Ink Co., 3, 4; Carbide & Carbons Chemical Co., 16, 17; Celanese Corporation of America, 48, 83, 84; Columbian Carbon Co., 67; Commerical Solvents Corp., 68, 73; Cuno Engineering Corp., 77; Dewey & Almy Chemical Co., 57; Dow Chemical Co., 80, 81, 82; E. I. duPont de Nemours & Co., 28, 71, 72; Goodyear Tire & Rubber Co., 52, 53, 54; Hercules Powder Co., 5, 6; Heyden Chemical Corp., 27; Herman Hockmeyer & Co., 66; Hy-R-Speed, Inc., 13; Kennedy Minerals Co., 11; Kinetic Dispersions Corp., 7, 8; Metals Disintegrating Co., Inc., 40; Mineral Pigments Corp., 1; Monsanto Chemical Co., 49, 50; Mooney Machine Mfg. Co., 21; Moore Dry Dock Co., 62; Morehouse-Cowles, Inc., 22; C. K. "Bud" Myers, 29; Naftone, Inc., 14; National Starch Products Inc., 38; Neville Chemical Co., 20; Nopco Chemical Co., 41; Nuodex Products, Inc., 35; Oronite Chemical Co., 9; Pacific Coast Paint & Varn. Production Clubs, 36; Pacific Vegetable Oil Corp., 18; Pacific Smelting Co., 12; Patterson Foundry & Machine Co., 58-59; Reichhold Chemicals, Inc., 55, 56; R-B-H Dispersions, 47; Rohm & Haas Co., 19; Shawinigan Resins Corp., 60, 61; Shell Chemical Corp., 51; Shell Oil Co., 64; Specialty Resins Co., 25; Spencer Kellogg & Sons, Inc., 42, 43; Standard Oil Company of California, 78, 79; Velsicol Chemical Corp., 15; Wharton Jackson Co., 2; C. K. Williams & Co., 26; Witco Chemical Co., 44.

•

NPVLA 69th Convention

The 69th Annual Convention of the National Paint, Varnish and Lacquer Association will be held November 12-14 in Los Angeles. Registration, hospitality and business sessions have been scheduled for the Hotel Statler. Social events will be held at the Ambassador and Biltmore hotels.

NEWS

Three Paint Symposia Planned for ACS Meet

Three symposia and a general session have been scheduled for the Division of Paint, Plastics and Printing Ink Chemistry section of the American Chemical Society. The Society is holding its Spring Meeting April 8-13 in Dallas, Texas.

R. B. Akin will preside at the general session, Rufus F. Wint will preside at the "Symposium on Significant Recent Developments In Cellulose Lacquers" which will be held in a morning and an afternoon session, and Fred W. Adams will preside at the "Symposium on Characterization of Polyethylenes."

The "Symposium on Synthetic Resins for Surface Coatings" will be held jointly with the Division of Chemical Marketing and Economics. James E. Sayre will preside.

•

Federation Council To Meet In Los Angeles

President Clyde L. Smith, of the Federation of Paint and Varnish Production Clubs, has announced that the Spring Meeting of the Federation Council will be held at the Statler Hotel in Los Angeles March 24.

The Federation Board of Directors, Finance Committee, and Chairmen of key Federation Committees will meet at the same time.

This meeting will be held in conjunction with the Third Biennial Spring Symposium and Raw Material Exhibit of the West Coast Paint and Varnish Production Clubs which is being held at the Statler Hotel, March 22-24.

•

Mautz Holds Sales Clinic

"Make Sales Click in '56," was the theme of the Mautz Paint Dealer Sales Clinic held recently at the University of Wisconsin Memorial Union.

Bernhard Mautz, president of the Mautz Paint & Varnish Co., welcomed the 450 dealers and their wives and also 35 Mautz sales representatives from 14 states.

PUDDING FOR THE PRESIDENT: Frank Gaudio, right, paint technician at the T. F. Washburn Company laboratories in Chicago, demonstrates "pudding" consistency of the company's new "Burnok" gel paint to Linus O. Smith, Washburn president. The paint remains in its gelled form even when removed from can and allowed to stand exposed on a flat surface. Friction causes the paint to liquefy. Although the paint looks like pudding, it spreads like butter.

Volume of Acrylic Paint Sales Doubled In 1955

Acrylic paint sales doubled in volume during 1955 and the number of companies producing acrylic paints also doubled, according to a report presented at the Case Institute of Technology by Gerould Allyn of the Rohm & Haas Company.

Allyn's report was presented at a recent three-day conference of architects and paint men sponsored by the Institute's Organic Coatings Research Laboratory in Cleveland. The conference coincided with the third anniversary of the introduction of acrylic emulsions for the paint industry. Acrylic latex was first put on the market by Rohm & Haas in 1953, and it has now become one of the "big three" in the rapidly growing water-vehicle paint industry.

Modern water paints are only eight years old, Allyn said, but annual production has already passed the fifty million gallon mark. Figures on total sales achieved by each of the latex types, butadiene styrene, polyvinyl acetate and acrylic, have not been released by the producers, but it is known that production of all water-vehicle paints has been increasing at the rate of at least five million gallons a year for the past five years.

Paint Industry Told To Hire Students In Summer

The paint industry can ease its shortage of technicians by hiring science students this summer, Milton Glaser told Philadelphia Paint & Varnish Production Club members at a recent Executive and Educational Committee Meeting.

Glaser, president-elect of the Federation of Paint & Varnish Production Clubs, said that paint manufacturers have been shortsighted in the past feeling they don't get much in return when hiring college or high school students for summer work. Industry experience shows, however, that such students can do useful work. But more important to the paint industry than the immediate return, is the association of young technically-minded students with the industry, he pointed out.

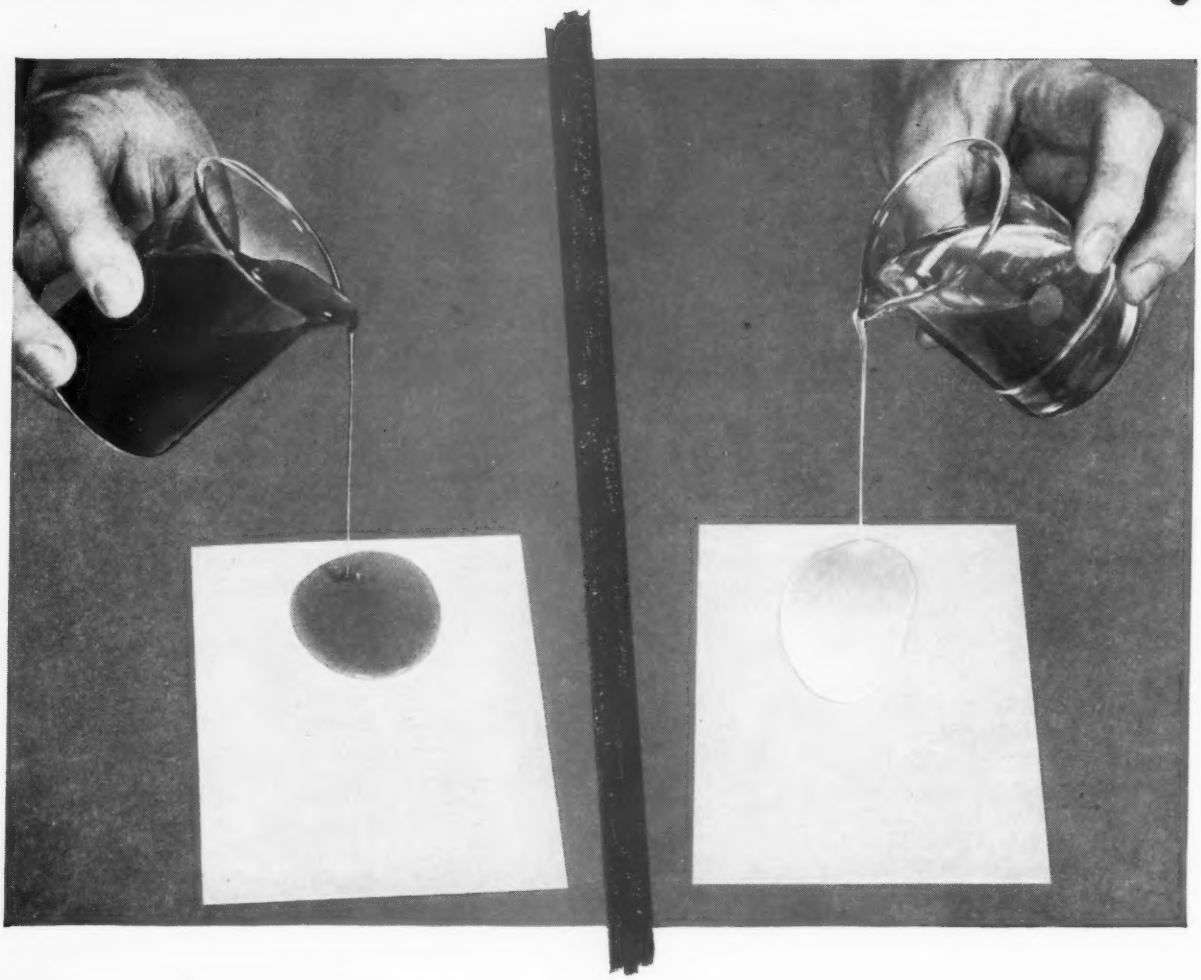
•

N. Y. C. Sanitation Show

Plans have been announced for the First International Sanitation Maintenance Show & Conference. It will be held Oct. 14-16 in the New York City Coliseum.

Sponsoring organizations are the National Association of Bakery Sanitarians, the Association of Food Industry Sanitarians, and the Industrial Sanitation Management Association.

COMPARE THE CLARITY!



Even after long storage, Celanese* Solvent 601 inhibits discoloration of nitrocellulose lacquers

Here's a graphic demonstration of the bonus value Celanese Solvent 601 has as an aid in preventing discoloration of clear lacquers. Concentrations of as little as 5-15% can often eliminate the need for special lined drums or tanks.

Color stability is just one of the reasons why you should consider CS 601 as a low-cost replacement for MEK in either vinyl or nitrocellulose formulations. In solvent power, evaporation rate and other working properties, it is interchangeable with MEK.

Ask your Celanese representative to show you how you can take advantage of CS 601 economies in your formulation. For new technical bulletin, write to Celanese Corporation of America, Chemical Division, Dept. 558-C 180 Madison Avenue, New York 16, N. Y.

*Reg. U. S. Pat. Off.

CLARITY COMPARISON of 2 clear lacquers – after 25 weeks in jars containing steel balls. The lacquer on right contained 12% of CS 601 as one of active solvents in formulation. The other lacquer (left) contained standard solvents of equivalent properties.

CHEMICAL PROGRESS WEEK-APRIL 23-28

Celanese* CHEMICALS

Competitive

Bid . . . after bid . . . after bid

Call

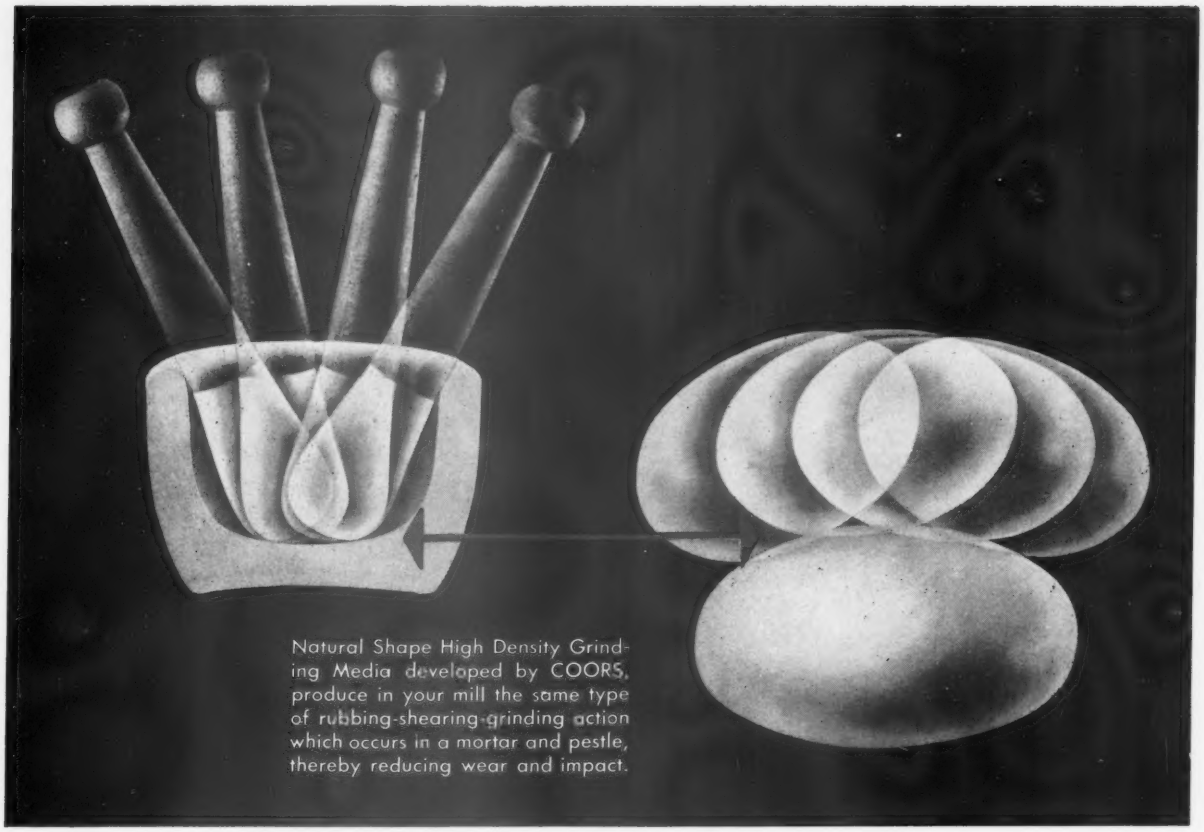
Cargill

Incorporated

PRODUCT OF Cargill CREATIVE PROCESSING

Suppliers to the Paint and Varnish Industry

Linseed Oil • Soybean Oil • Fish Oil • Alkyd Resins • Specialty Products



Natural Shape High Density Grinding Media developed by COORS, produce in your mill the same type of rubbing-shearing-grinding action which occurs in a mortar and pestle, thereby reducing wear and impact.

Coors high density NATURAL SHAPE® grinding media gives mortar and pestle action!

Result: Minimum Wear with Maximum Grinding Efficiency

Shape of grinding media used in a mill apparently influences grinding results—therefore COORS developed the Natural Shape High Density Media.

In a mortar and pestle, grinding is done when the smoothly curved surfaces are forced together under pressure with a rubbing or shearing motion. COORS High Density Natural Shape Media, because of their shape and weight, do the job of grinding in a similar manner. In a mill charged with COORS Natural Shape Media you have, in effect, many thousands of mortars and pestles to do your grinding!

COORS Natural Shape Media (made of the same high density, high strength alumina ceramic as COORS Grinding Balls and Mill Lining Brick) are used in porcelain lined, rubber lined and stone lined pebble mills to increase mill production capacity. Also, they are used to replace steel balls in steel lined mills where iron contamination must be minimized.

Utilize the mortar and pestle action of COORS Natural Shape Grinding Media to increase the production capacity of your pebble mills. Write today for complete information, samples and the name of your local representative.

COORS PORCELAIN COMPANY
GOLDEN, COLORADO

Manufacturers of Coors High Density Grinding Media and Mill Linings.
National Sales Representatives . . . LZP Industrial Ceramics Co., 2500 West 7th Ave., Denver 4, Colorado

for
coloring quality paints,
inks and plastics

for
non-bleeding

for
light-fastness

for
transparency

HUDSON RED DARK has superior, new qualities which mean dependability in paints, inks and plastics. By comparison, it sets new standards for the field—in transparency, brightness and bluish tone.

It is non-bleeding in lacquers and aromatic solvents, in D.O.P., most plasticizers, in alcohol, in hot or cold water, in brine. It is capably light-fast, both fullshade and in reduction.

It is strongly recommended for lithographic, typographic, and intaglio printing processes . . . for tin and food wrapper printing . . . for coloring rubber and vinyl plastics.

Our Technical Department has data on the baking properties, the resistance to acids, fats and greases, the fineness, and the outstanding tinctorial strength of Hudson Red Dark. We invite you to make a practical plant trial of this new product. Call upon the services of our Technical Department, or contact our nearest sales office.

From Research to Reality . . .

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A SALES DIVISION OF
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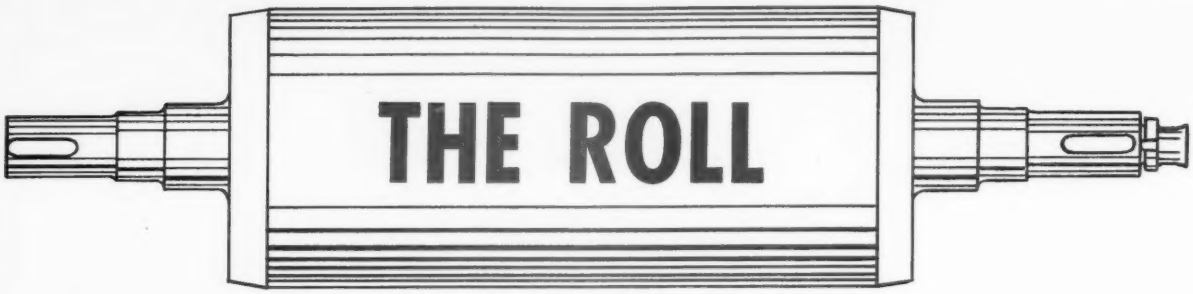
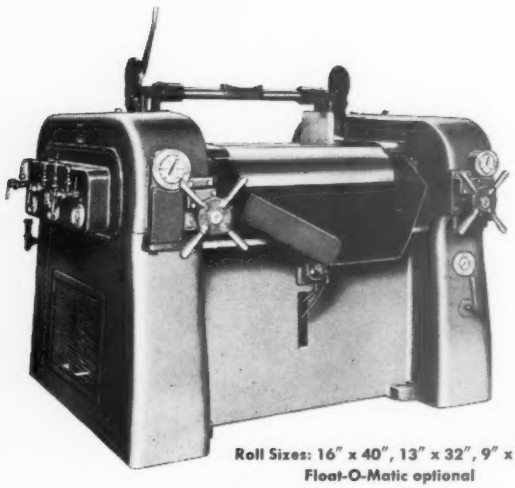
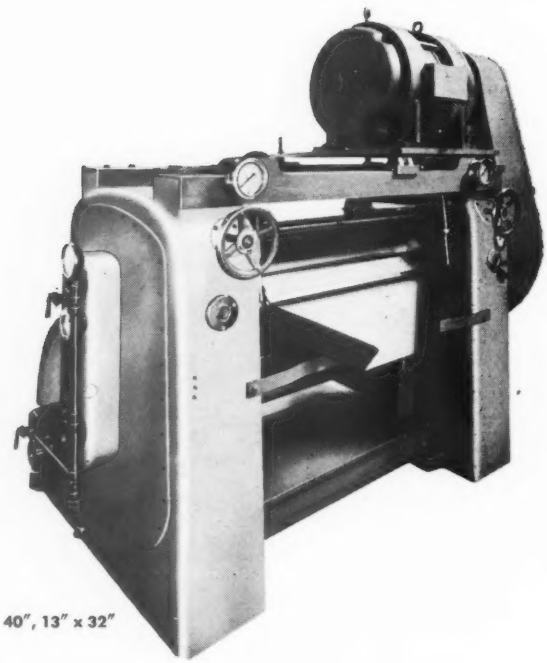


IS THE

HEART OF EVERY MILL



Roll Sizes: 16″ x 40″, 13″ x 32″, 9″ x 24″
Float-O-Matic optional



Roll Sizes: 16″ x 40″, 13″ x 32″

Among the many excellent engineering features that distinguish Lehmann Roller Mills, none is more important than the roll itself. Heat transfer, so vitally important to uniform dispersion (roll coverage), has attained an outstanding degree of efficiency in Lehmann Rolls. This is due to design, material, precision machining, and end head construction.

Centrifugal casting provides an extremely tight, dense grain structure with greater uniformity of hardness at the grinding surface. This chilled white iron roll surface is inseparably bonded to a high quality gray iron core, for maximum strength and resilience. The surface of the roll is bevelled at both ends for side shields.

Unique end head construction insures longer roll life, high power transmission and shock resistance.

Sight-O-Matic* provides three-fold gauge control over: dispersion, take off efficiency, product temperature.

The cost-saving features of Lehmann Mills afford the manufacturer new opportunities, in these days of increasing competition. Let us show you what a modern Lehmann Mill can do for you.

*Reg. U. S. Pat. Off.

LEHMANN®

J. M. LEHMANN COMPANY, Inc.

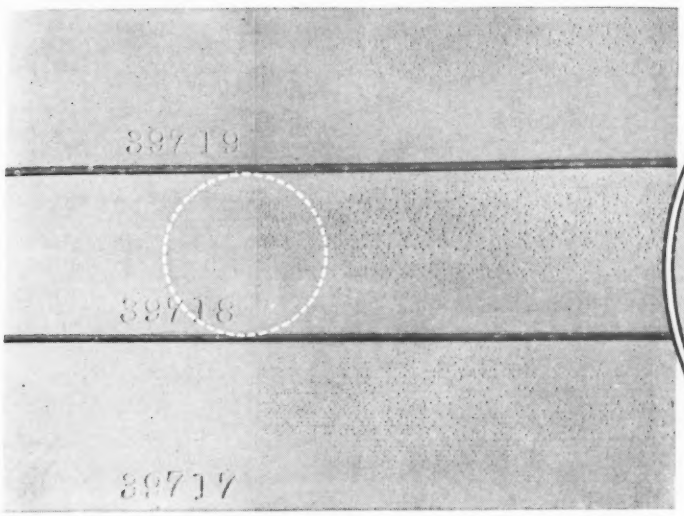
COAST-TO-COAST SERVICE

Moore Dry Dock Company
Oakland, California

Lammert & Mann Co.
Chicago 12, Illinois

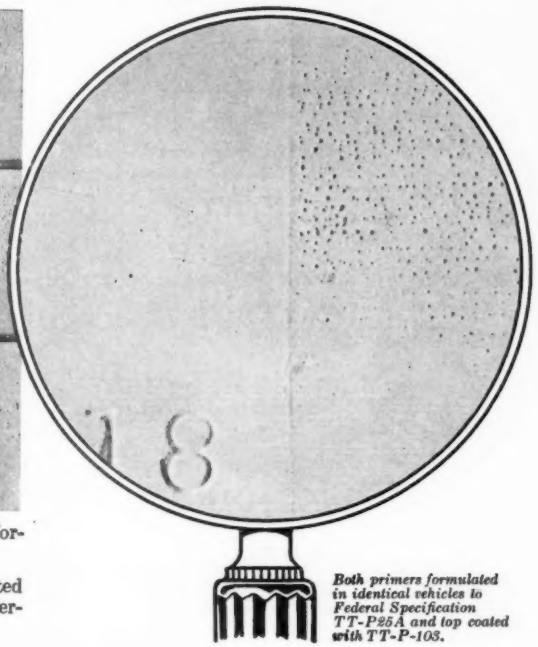
J. M. Lehmann Co., Inc.
Lyndhurst, New Jersey

Compare the difference in these two paint primers!



Test panels on left show that *no blistering* occurred in the paint primer formulated with Eagle-Picher Super Sublimed White Lead.

Test panels on right show definite *blistering* in the paint primer formulated with an equal volume of a highly reactive lead pigment. Compare the difference in the magnified area on extreme right.



Both primers formulated in identical vehicles to Federal Specification TT-P-25A and top coated with TT-P-105.

EAGLE-PICHER
SUPER SUBLIMED WHITE LEAD
provides greater blister resistance!

Accelerated tests prove that blistering—caused by loss of adhesion when moisture content is high—*does not occur* when quality house paint primers are formulated with Eagle-Picher Super Sublimed White Lead. Even under extremely adverse moisture conditions, these primers show very little water absorption, low volumetric swelling and superior adhesive characteristics.

Insure greater blister resistance in your house paint primers. Specify Eagle-Picher Super Sublimed White Lead. Remember, Eagle-Picher maintains rigid quality control from ore to finished pigment . . . and as the largest producer of *both* zinc and lead pigments provides unequalled and unbiased customer service!

THE FORMULATION

	Pounds per gal.
#41 Super Sublimed White Lead	4.64 lbs.
Titanium Dioxide—Rutile	1.13
Magnesium Silicate	3.41
Raw Linseed Oil	1.32
Z Linseed Oil	2.47
Mineral Spirits	1.62
24% Pb	.06
6% Mn	.03
	14.68 lbs.

PVC—35.5%

Since 1843

EAGLE EP PICHER

THE EAGLE-PICHER COMPANY

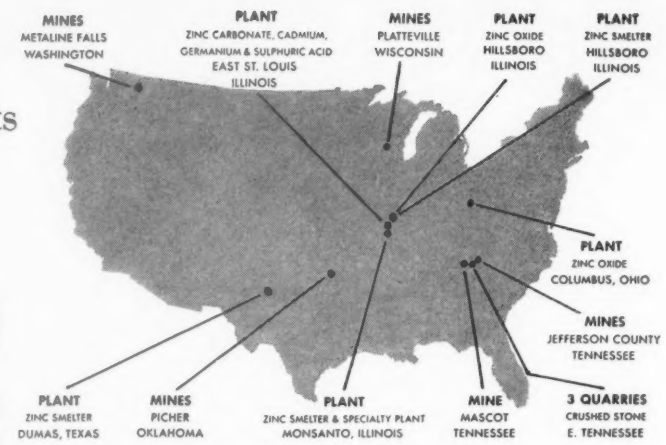
Largest Producer of Both Zinc and Lead Pigments

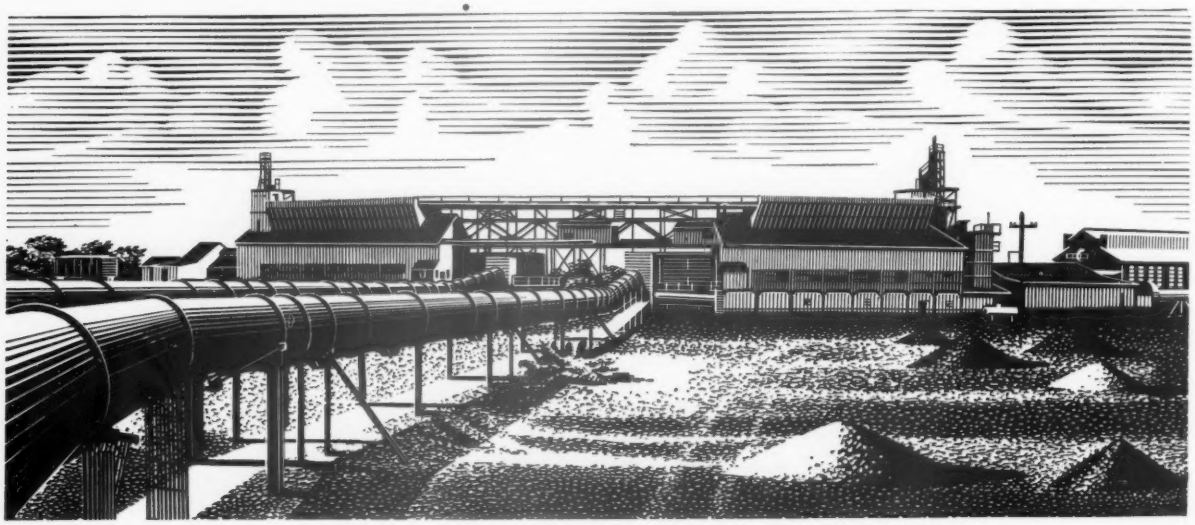
General Offices: Cincinnati 1, Ohio

Regional Sales Offices: Chicago, Cleveland, Dallas, New York, Philadelphia, Pittsburgh

American Zinc and its products

from A *to* Z





DUAL OPERATION AT HILLSBORO, ILLINOIS

(1) The Oxide Division supplies American process lead-free and leaded zinc oxide, as well as French process zinc oxide. (2) In the Metal Division, Prime Western, Select, Brass Special, Intermediate and High Grade slab zinc are produced. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

FISHER

GAS ANALYZER
Chromatographic Method

The "Fisher-Gulf Partitioner" uses a 14-foot thermostatted chromatographic column to resolve each mixture into its pure components. Each compound is said to be indicated as a separate peak in the "spectrum." A built-in integrator simultaneously computes and records a number proportional to the quantity of the component making the peak.

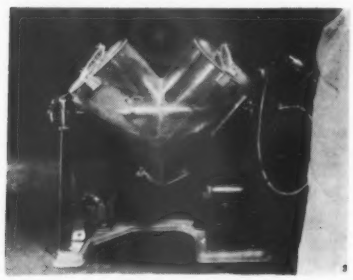
In research, partition chromatography has been applied to separation of amines; fatty acids; cis and trans isomers; ortho, meta and para isomers; saturated and unsaturated hydrocarbons; cycloalkanes; chlorinated hydrocarbons; aniline and related compounds and derivatives.

The Partitioner uses very small samples-only 0.01-0.03 ml of liquid or 0.3-0.6 ml of gas, according to manufacturer. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

LIQUID-FEED-BLENDER
Quick Mixing of Liquids and Solids

A new type liquid-feed-blender for commercial processing that blends liquid and dry materials swiftly in one operation is claimed to have been perfected.

Designed as an integral part of the company's twin shell blender, the liquid-feed modification is said to make it possible for the first time to feed liquids evenly into dry materials during blending.



PATTERSON-KELLEY

The device consists of an improved intensifier bar which revolves inside the twin shell blender. Liquid flows from a hollow feeder tube within the bar, onto a revolving offset disk. Liquid droplets are flung from the edge of the revolving disk by the slinging action of centrifugal force. It is this slinging action, combined with the wiping action of the dry material on the disk, that achieves effective dispersion, according to the company. A cylindrical wire cage surrounding the intensifier bar and revolving with it is said to prevent the formation of any clumps. The Patterson-Kelley Co., Inc., E. Stroudsburg, Pa.

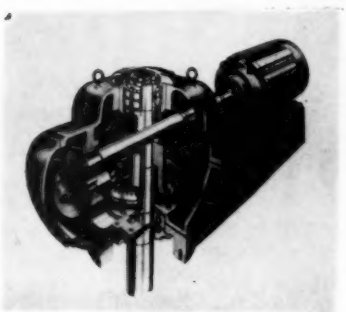
FORK TRUCK
3000 Lb. Capacity

A new 3000 pound capacity model, the second of its Cargo-Scout fork truck series, is engineered to handle loads in confined areas at maximum speeds. It features compact design with a short wheelbase and 360° steering to permit maneuvering in narrow aisles and inside truck trailers and box cars. A device is provided on the steering mechanism to prevent steering wheel kick-back. On jobs where the operator must get on and off the truck frequently, stand-up end control provides extra convenience.

The model has a 3000 pound capacity at 24″ on a 68″ high model and a 3000 pound capacity at 20″ on an 83″ high model. The Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

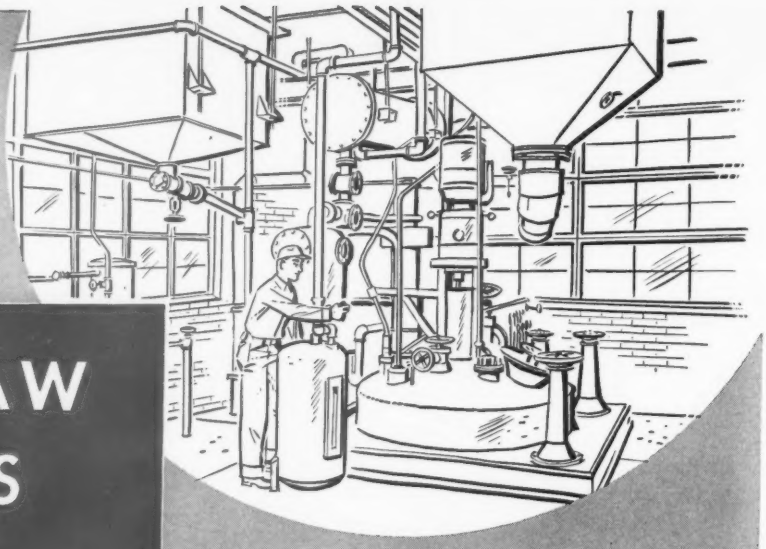
FLUID AGITATORS
Fourteen Speeds

Company claims the following features for its new line of fluid agitators: low head room design—maximum bearing span, with minimum headroom; helical change gear set, within housing, allowing for ready selection of up to 14 different standard speeds; large



PHILADELPHIA GEAR

heavy duty output shafting resulting in less shaft deflection at stuffing box or mechanical seal; steady operation of long overhung agitator shafts; heavy duty inboard bearing support providing extra rigidity; spiral bevel gears of hardened steel, accurately lapped for long and quiet operation; dry-well construction preventing oil leakage down output shaft; labyrinth-type seal on input shaft for effective sealing with minimum friction. Philadelphia Gear Works, Inc., Erie Ave., & G St., Philadelphia 34, Pa.



HARSHAW DRIERS

Every Batch is Tested for Uniformity

Harshaw's precise manufacturing specifications demand the following tests for every batch of driers produced:

- **Metal content**
- **Specific gravity**
- **Color**
- **Viscosity**
- **Total solids content**
- **Flash point (T.C.C.)**
- **Moisture content**
- **Acid value**
- **Miscibility with raw linseed oil**
- **Miscibility with mineral spirits**
- **Benzene insoluble content**
- **Customer's specified tests**

Order your next requirement of Driers from Harshaw. Produced and tested at our Plant, Gloucester City, N. J. . . . The most modern facilities available . . . For nationwide distribution through 18 stock points.

TYPICAL HARSHAW DRIERS

LIQUID DRIERS
- Uversol (Naphthenate) Liquids
- Linoresinate Liquids
- Linoleate Liquids
- Lithos
- Octasols
- Pastes
- Pastalls

SOLID DRIERS
- Uversol (Naphthenate) Solids
- Linoresinate Solids
- Linoleate Solids
- Soyate Solids
- Fused Resinates

POWDERED DRIERS
- Precipitates Resinates
- Drying Salts:
  - Cobalt
  - Lead
  - Manganese
  - Zinc

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

N E W
MATERIALS — EQUIPMENT

BIDDLE

THICKNESS GAUGE
For Non-Magnetic Coatings

Company claims that its gauge for measuring the thickness of non-magnetic coatings such as paints or plating on ferrous bases has the following features: it will determine thickness on radii (irregular or curved surfaces present no problem); it will not damage coatings; it has a mean accuracy of ±15 per cent or 0.0001 inch whichever is greater; it has a range of 0.0002 to 0.015 inches (0-400 microns). James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

PAPER WIPERS
For Industrial Use

Disposable industrial paper wipers are now available for the first time from the company in two different sizes: the original large size wiper, "Scott Brand No. 59," which consists of two-ply sheets that measure nine and five-eighths by thirteen and five-eighths inches, and the new smaller size paper wiper, "Scott Brand No. 58," consisting of two-ply sheets that measure nine and five-eighths by ten and one-quarter inches.

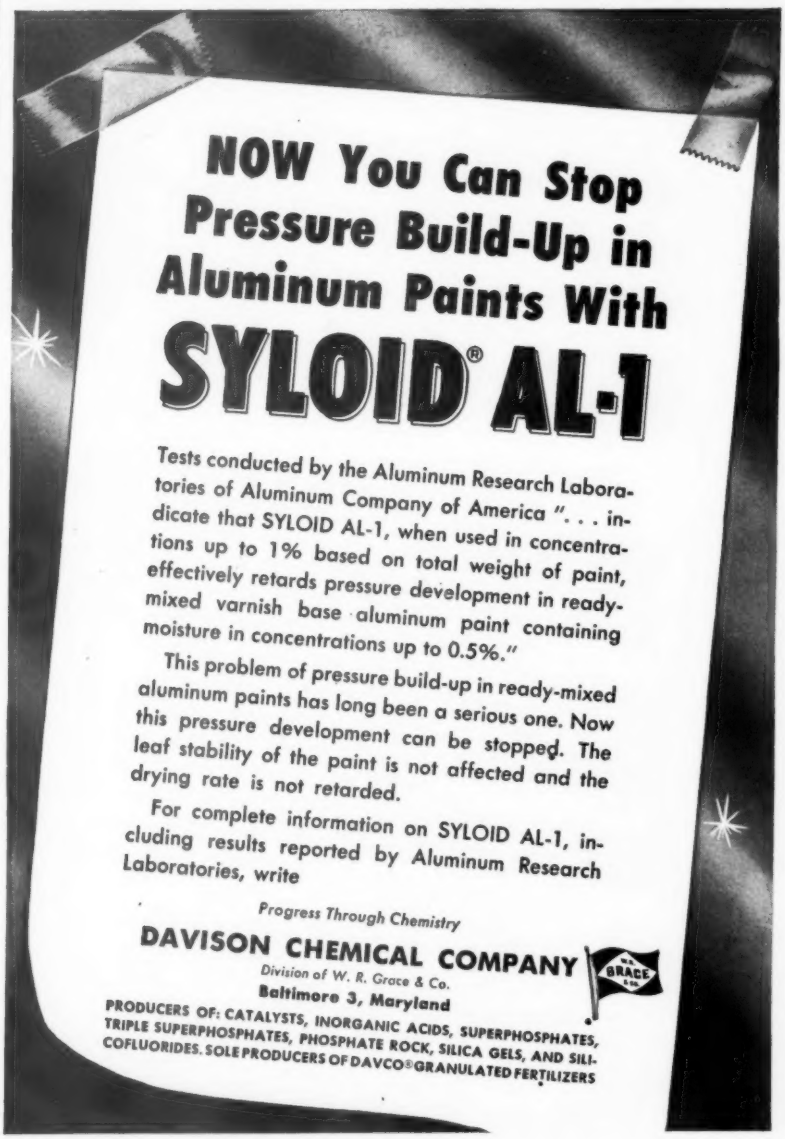
Both are being packaged in newly designed boxes, each containing 125 wipers, with 18 boxes to a case. Each box also has the special "pop-up" feature that makes another wiper automatically available the instant one has been removed from the container. Scott Paper Co., Chester, Pa.

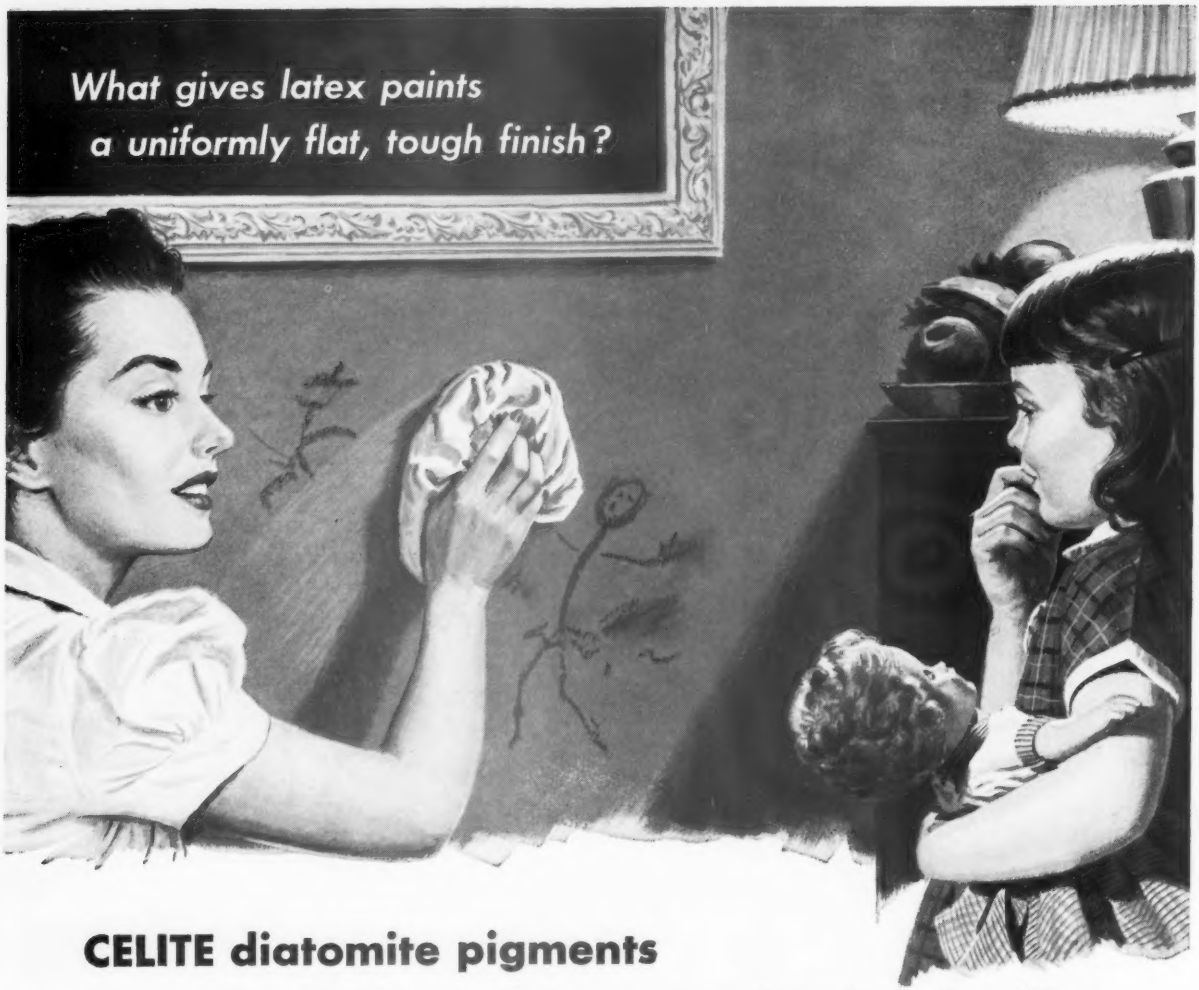
ALKYD RESIN
Short Oil, Non Oxidizing

"Rezyl 94-5," a short oil, non oxidizing type alkyd resin, is intended for use with "Beetle" or melamine resin in the formulation of white baking enamels and in nitrocellulose lacquers particularly exterior metal lacquers.

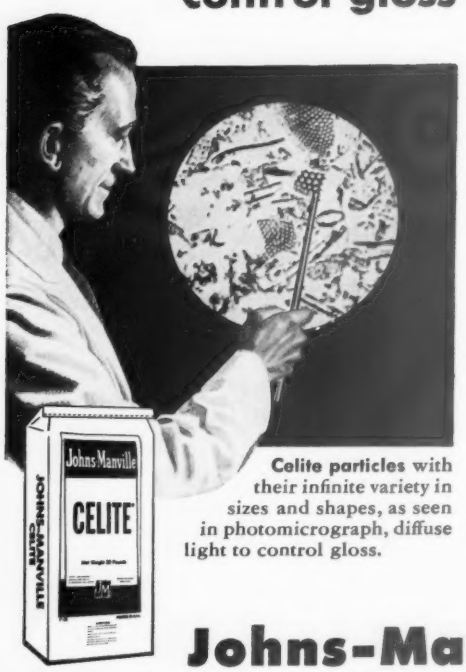
White baking enamels may be formulated with "Melamine 245-8" or "248-8." Baking schedules may range from 60′ at 200° F. to 10′ at 350° F. The finishes are said to have unusual surface hardness, gloss and gloss retention and resistance to detergents, weak acids and alkalis. "Beetle Resin 227-8" or "220-8" may be used instead of melamine resin with some sacrifice in alkali, acid and detergent resistance. "Rezyl 94-5" has excellent pigment grinding characteristics, although a higher gloss is sometimes obtained by grinding in the Rezyl-amino combination, according to the company.

Rezyl 94-5 may be used with nitrocellulose for the formulation of exterior gloss lacquers when a high degree of durability and gloss retention is important, according to the company. It may be used with nitrocellulose for high grade water white wood lacquers also. 100 nitrocellulose, 120 Rezyl 94-5 solids, 30 DOP are typical solids ratios. American Cyanamid Co., Plastics and Resins Div., 30 Rockefeller Plaza, New York 20, N. Y.


NOW You Can Stop Pressure Build-Up in Aluminum Paints With
SYLOID® AL-1
Tests conducted by the Aluminum Research Laboratories of Aluminum Company of America ". . . indicate that SYLOID AL-1, when used in concentrations up to 1% based on total weight of paint, effectively retards pressure development in ready-mixed varnish base aluminum paint containing moisture in concentrations up to 0.5%."
This problem of pressure build-up in ready-mixed aluminum paints has long been a serious one. Now this pressure development can be stopped. The leaf stability of the paint is not affected and the drying rate is not retarded.
For complete information on SYLOID AL-1, including results reported by Aluminum Research Laboratories, write
Progress Through Chemistry
DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland
GRACE
PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, TRIPLE SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO® GRANULATED FERTILIZERS



CELITE diatomite pigments control gloss while strengthening the film



Celite particles with their infinite variety in sizes and shapes, as seen in photomicrograph, diffuse light to control gloss.

FOR YEARS, Celite* has been known as an excellent flatting agent that offers complete control of gloss to any desired degree. But did you also know that, unlike other flatting agents, Celite shows no adverse effect on the washability of the paint film . . . in fact, these microscopic particles of silica actually reinforce it with extra strength and durability.

Celite pigments also help solve another problem that troubles latex paint manufacturers—*adhesion.* The barbed-edge particles project through the paint film to bite into both bare surfaces and subsequent coats. And their porous structure forms a permeable film that permits faster escape of volatiles for speedier drying. Celite can frequently be used as a replacement for some of the costly prime pigment, thanks to its extra dry hiding power.

Write today for complete information on Celite diatomite pigments. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.

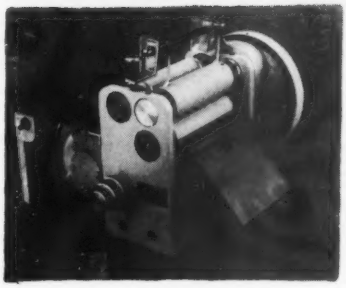
JOHNS-MANVILLE JM PRODUCTS

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

Johns-Manville CELITE

THE EXTENDER PIGMENTS FOR ALL COATINGS

NEW MATERIALS — EQUIPMENT



PHARMACEUTICAL

3-ROLLER MILL
Four Models

A 3-roller paint mill, available in four models for producing from 12 to 200 pounds an hour, is said to be suitable for test work, sample mixing, and moderate production runs. It is fully automatic and electrically operated. The adjustment of the parallel rollers is completely automatic. The three rollers are available in hard porcelain or stainless steel, and the hopper is made of stainless steel. Pharmaceutical & Chemical Industry Supply Corp., 16 Hudson St., New York 13, N. Y.

OLEIC ACID
Single Distilled

A new single-distilled oleic acid, "Emersol 213 Low Titer Elaine," is identical to the standard "Emersol 211 Low Titer Elaine" except for a lighter color as follows: Emersol 213: 5y/1R—10y/2R (1" Lovibond), Emersol 211: 10y/3R —30y/6R (1" Lovibond).

Both are available in tankcar quantities, carload and ton lots in standard 55 gallon drums. Chemical Sales Dept., Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

FATTY ALCOHOL
Highly Stable

A new fatty alcohol, known as "ADOL 40," is a highly stable, long chain (C_{18}) unsaturated fatty diol. It has three chemically reactive positions, two Hydroxyl groups, one on a terminal carbon atom and the other on the 12th carbon, and one double bond.

Product is said to be readily soluble and an excellent solvent for chemicals. It is a clear, liquid, non-drying alcohol. The cloud point is below 10° F.

Available for the first time in tank-car or LCL quantities, product offers unlimited reaction possibilities in the manufacture of polyester modifiers, surfactants and quaternary derivatives, according to the company. Archer-Daniels-Midland Co., Chemical Products Division, 2191 W. 110 St., Cleveland 2, Ohio.

DIAL SCALES
Insures Exactness of Weight

A new line of "Floaxial" cabinet dial scales has been engineered to insure exactness of weight, eliminate possible human errors, and insure precision performance despite the most rugged operating conditions, according to the company. Four new features have been incorporated in the cabinet dial design: a direct reading dial, a full swivel head, a cage-type central column construction, and controlled-speed dash pot. At present, these cabinet dial scales are available in 36 models ranging in total chart capacity from 500 lbs by ½ lb. graduations to 120,000 lbs by 20 lbs. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

LESS THAN
1¢
A GALLON
That's all it costs to remove the odor from your paint with Maskit #2
• Makes your paint more acceptable to painters and home owners.
• Masks the odor in the can and while paint is being applied . . . as well as during – and after – the drying period.
• Does not affect drying time or color durability.
• Amazingly economical . . . use 1 lb. of Maskit #2 to 150 gallons of paint.
MASKIT #2 is equally effective in paints, lacquer thinners, varnishes and other similar types of products. Order a trial pound today!
$1.50 lb.
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paintmaking problems are pushovers

thanks to

CO_2

by Liquid Carbonic

Moisture?
Forced up through the cooking reaction mixture, bubbles of CO_2 literally "sweep" out water vapor as it is formed. Result: faster reactions, improved product.

Skinning?
By displacing oxidation-causing air, CO_2 prevents the formation of "skin" in thinning tanks, storage tanks, shipping containers and pipes.

Flash Fires?
An inert, heavier-than-air "blanket" of CO_2 gas effectively displaces oxygen, eliminates possibility of fire or explosion.

Clogged Filters?
CO_2 purging cleans filters in a fraction of conventional cleaning time. In addition, CO_2-cleaned filters last far longer between cleanouts, aid oil recovery.

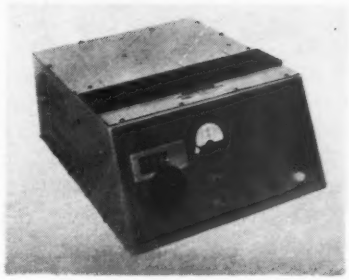
FREE BULLETIN
Gives complete details on the uses above plus other important CO_2 applications in the paint and varnish industry. Send for your copy of "The Use of CO_2 in Paint, Varnish and other Alkyd-Type Resin Manufacturing."

World's Largest Producer of

THE LIQUID CARBONIC CORPORATION

3128 South Kedzie Avenue
Chicago 23, Illinois

NEW MATERIALS — EQUIPMENT



MANUFACTURERS

COLORIMETER
Differential Type

A new Colormaster Differential Colorimeter, "Model IV," is claimed to accurately make color measurements with a sensitivity to color differences exceeding that of the human eye. It measures the color transmission and reflectance of such substances as paints, liquid solutions, pigments, and slurries within 0.0001 reflectance units, according to the company. Manufacturer says that a complete set of color measurements can be made with the unit in less than thirty seconds. Manufacturers Engineering & Equipment Corp., Hatboro, Pa.

VINYL PROPIONATE MONOMER
Emulsion Paint

The company's Chemical Division has announced the addition of vinyl propionate to its vinyl monomer line.

Either the homo or copolymer of vinyl propionate can be produced with the usual polymerization techniques, the company announced. The new monomer can be copolymerized with most available commercial vinyl monomers, acrylic and methacrylic esters, maleic anhydrid and maleic esters, styrene, butadiene and acrylonitrile, as well as acrylamide, vinyl acetate, vinyl acetate, vinyl chloride, and vinyl butyrate, according to the company.

Among the expected fields of application for the new monomer are emulsion paints, adhesives, laminates and coatings. Celanese Corporation of America, 180 Madison Ave., New York 16, N. Y.

VINYL ESTERS
Resin Application

Tank car quantities of vinyl propionate, vinyl butyrate and vinyl 2-ethylhexoate are now being produced at the company's Niagara Falls, N.Y. plant.

Polymers based on these esters are being used in the surface coatings, adhesives, oil additives and vinyl sheeting fields. These monomers have been copolymerized with several other ethylenic monomers, including vinyl acetate, acrylic esters, maleic esters, and vinyl chloride. They provide new raw materials for the plastics industry, according to the company. Union Carbide ad Carbon Corp,. 30 E. 42 St., New York 17, N.Y.

WOOD STAIN
From Citrus Products

A new type of flavanone azo dye has been created by combining hesperetin or naringenin found in citrus pulp and citrus waste with aniline bases and dispersing the resultant dye in a water solution.

The combination is said to provide an excellent wood stain composition. This citrus aniline dye compound can be readily fixed in the cellulose pores of wood as it is derived from cellulose and compatible with it, according to the company. It may also be applied as a hot or cold solution to the wood.

The dye stains or stain bases may be added to or incorporated with

Why was the little schoolhouse RED?

AT THE turn of the century "the little red schoolhouse" was a familiar sight in the land. Because money came hard, these little frame structures were painted only infrequently. To protect their exteriors from the ravages of the elements, paints containing weather-resistant red iron oxide were used—the iron oxide lending its color as well as its durable protectiveness.

REICHARD-COULSTON produced much of the rich, red iron oxides which went into those long-lasting "little red schoolhouse" paints.

During our 101-year history, REICHARD-COULSTON has kept pace with the technical advances in the paint industry. Part of the results of this continued growth are REICHARD-COULSTON IROX and SOFTEX synthetic reds. These synthetic red oxides are valued for their color softness, fine particle size and exceptionally rich color. Manufacturers prefer them for enamels, latex emulsions, ranch red house paints, alkyd flats and all finishes requiring high tinting strength pigments.

Find out how REICHARD-COULSTON colors such as IROX and SOFTEX reds can help *your* production. For free laboratory samples and technical data, write today.

Natural IRON OXIDE PIGMENTS *Synthetic*

Reichard-Coulston, Inc.

15 EAST 26th STREET, NEW YORK 10, N. Y.

Warehouses in principal cities. Factory: Bethlehem, Pa. Over a century of manufacturing and service.

National Lead Company, Experimental Test Station, Sayville, Long Island, is set up to develop facts on the durability, beauty, and practicability of house paints. In existence since 1917, it now has 2½ miles of test fences, more than 30,000 active tests.

FOOLPROOF

your exterior paints with Dutch Boy® "45X"

(Basic Silicate White Lead)

TAKE IT from leading makers of exterior paints: for *uniform* performance, you need lead.

And take it from Sayville, National Lead's Experimental Test Station, "Dutch Boy" Basic Silicate White Lead "45X" *assures* uniform performance. No matter how much exposure conditions – or painting practices – vary!

Think about your white House Paints, for example.

With "45X" – Sayville tests show – you definitely improve self-cleaning. Yet, you preserve film integrity!

In tinted House Paints, you step up film durability with "45X". Also resistance to color changes! In Primers, you step up adhesion.

And so it goes!

Everytime you put "45X" into exterior paints, you improve one property or another underlying *uniform* performance.

This minimizes complaints. Saves you time. And money! You, you alone, know what it costs to run down complaints yearly. And the complaints you *don't* hear about! Even you don't know what they cost – in repeat business and good-will.

Fewer complaints—
fewer pounds of lead, too!

That's because the reactive portion of each "45X" pigment particle is concentrated at the surface. This makes proportionately larger amounts of lead *available.*

Fewer complaints, fewer pounds of lead! You just can't lose, putting "45X" in your exterior paints!

National Lead Company: New York 6; Atlanta; Buffalo 3; Chicago 80; Cincinnati 3; Cleveland 13; Dallas 2; Philadelphia 25; Pittsburgh 12; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.). In Canada: Canadian Titanium Pigments Ltd., 630 Dorchester St., W., Montreal.

cellulose ester or ether solutions and lacquers as well as other lacquers particularly those containing solvents such as alcohols and hydrocarbons, according to the company. Color dipping lacquers, with fast colors, may thus be produced. Various types of nitrocellulose compositions may be combined with stain bases or compositions of the present invention.

Company says that with the new invention, it is now possible to form water soluble dye which yields, upon dispersion in an aqueous vehicle, a wood stain which is substantially fast to light and exhibits non-fading, non-grain raising properties. A wood stain is also provided which is said not to bleed through lacquer or varnish top finishing coats. Thus, the use of intermediate sealing coats is not necessary. Sealing coats may be used if desired. Chadeloid Corp., Dayton, Ohio.

PAINT ADDITIVE
Heat-Stable

"M-P-A," a multi-purpose paint additive, has been designed to withstand high processing temperatures encountered in high speed or other "hot-running" paint mills. Company says that product does not grain, seed or undergo any unfavorable change at elevated processing or storage temperatures and is effective in both aliphatic and aromatic solvent systems.

By developing a thixotropic gel structure in the paints to which it is added, product is said to impart sag resistance, better brushability, improved pigment suspension, controlled penetration and thixotropic body. Baker Caster Oil Co., 120 Broadway, New York 5, N. Y.

CORROSION INHIBITOR
For Water Emulsion Systems

A new vapor pressure corrosion inhibitor called "Akrode," is claimed more effective than most products now offered because of increased volatility and greater "throwing power."

Where emulsion paints tend to cause corrosion of metal containers when stored for an extended period of time, product is said to prevent or retard this corrosion as long as the cans remained closed. Viscosity, drying time and film hardness of the paint are not affected by product because only a small amount is required to provide corrosion protection, according to the company. Baird Chemical Corp., 254 W 31 St., New York 1.

SURFACE ACTIVE AGENT
Anionic Type

"Isomal 265," a new anionic surface active agent, has been developed for use by the paint and wall paper industries as a wetting agent, rewetting agent, penetrant, detergent and emulsifier. Company says that product is specially formulated to reduce processing time, increase processing efficiency and improve finished products.

The new fluid is a concentrated sulfonated ester which has many uses in the processing and improvement of pigments and paints, according to the company. As little as 0.05 per cent of the fluid is said to produce and effective solution for the removal of wall paper. According to the company, it is easily dispersed in alcohol, acetone, petroleum solvents, oils and chlorinated solvents in practically any type of application. Clear in appearance, it has a neutral pH factor and a specific gravity of 1.088 at 60°F. It is approximately 65 per cent active and mildly pleasant in odor. The Johnson-March Corp., Philadelphia, Pa.

close harmony with your paint formulations WITCOBLAK®

Superior Pigment Blacks

No. 32, No. 50, No. 100, Hitone, F-1, F-2, and F-3

Literature and samples on request

WITCO *36 Years of Growth*

WITCO CHEMICAL COMPANY
CONTINENTAL CARBON COMPANY

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Chicago • Boston • Akron • Atlanta • Houston • Amarillo • Los Angeles • San Francisco
London and Manchester, England

GREENS

4 Pure Chromium Oxides
and
2 Hydrated Chromium Oxides

Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.

The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.

Use the 2 hydrated chromium oxides for obtaining brilliant color and transparency in automotive finishes, high grade enamels and lacquers.

Your nearest Williams representative will be glad to provide you with full technical data and samples.

WILLIAMS
COLORS & PIGMENTS

EASTON, PA. • E. ST. LOUIS, ILL.
EMERYVILLE, CAL.

NEWS

M. K. Dhar Made Asia Advisor for Holland Firm

M. K. Dhar has been appointed technical advisor for the Asiatic territory of Kunstharsfabriek Synthese N. V., Katwijk aan Zee, Holland. The company manufactures alkyd resins, modified and oil reactive pure phenolic resins, maleic resins, polyester resins, urea resins, polyvinyl acetate emulsions, and highly dispersed nitro cellulose chips.

M. K. Dhar

Mr. Dhar received his training at the University of Calcutta and has worked in the factories and laboratories of a number of paint and varnish companies.

He will be responsible for the technical questions regarding the application of "Synthese" products, and his service will be available to company agents in the various countries.

•

Troy Adds New Agents

William Harrigan, marketing specialist of the Troy Engine & Machine Co., Troy, Pa., reports the following manufacturers' representatives, have joined Troy: R. T. Forbes Co., Boston, Mass.; Commercial Chemicals Inc., Buffalo, N. Y.; The Roy A. Ribelin Distributing Co., Dallas, Texas; The Roy A. Ribelin Distributing Co., Houston, Texas; Breffeilh & Sheahan, New Orleans, La.; Jesse S. Young Company, Inc., New York City; Commercial Chemicals, Inc., Rochester, N. Y.

•

To Discuss Paint Mills

A round table discussion on various types of paint mills has been planned by the New York Paint and Varnish Production Club for its April 5th meeting. Under discussion will be Pebble and Ball Mills, Roller Mills, Kinetic Dispersions, and Morehouse-Cowles Mills.

CHLORINATED RUBBER

(*From page 32*)

difficulties of our own plant protection in acid environments particularly, but also alkali and salt conditions. We were unable to control corrosion by painting as frequently as every six months. We found that chlorinated rubber coatings were resistant to these materials, and consequently were able to go to a three-year painting cycle and control corrosion much better. As time has gone on, we have changed our views from a coat of primer and a topcoat, which procedure we were following at one time, to the economical merit of applying more coats which last a longer period of time. At the same time, however, the problem at our plants continues to be toward the greatest economy possible. In this connection we have been constantly comparing by small tests and even large installations the merit of other coatings. We have tested and are using Neoprene coatings. It is interesting that Neoprene coatings require a primer; but the majority of commercial usage has indicated the merit of a chlorinated primer not only for Neoprene, but also for the newer material Hypalon. We have looked at epoxy coatings. A recent acid plant was primed and coated with a catalytic epoxy coating. We encountered a serious problem; namely, that the coating had converted so completely that there was great difficulty in developing a mechanism for getting good adherence to the epoxy topcoat on the epoxy primer. The plant exposure in this instance has not gone a sufficiently long time for us to make a study of economy from these protection studies.

None of the comments we have made are intended in any way to belittle such polymers as we have just spoken of. They are all effective materials—they have their peculiarities, but they also have their place in the corrosion problems that concern us all. They do have limitations, but so do chlorinated rubber coatings. In behalf of discussing the most complete information available, we believe that the limitations of chlorinated rubber should be stated: (1) The maximum temperature to which chlorinated rubber coatings should be subjected in immersion tests is approximately 140° F. The maximum drying temperature is approximately 225° F. (2) In such environments where ketones, aromatics, and ester solvents are part of the exposure such as spillage, chlorinated rubber coatings should not be used because they are either dissolved or lifted. (3) Animal and vegetable oils have a marked softening effect on chlorinated rubber coatings. (4) Resins and plasticizers that are used with chlorinated rubber must be indicated for the purpose. (5) The requirements of coating thickness and number of coats must permit the application of necessary coating thickness. (6) Residual solvents should be eliminated from coatings that are to be immersed in water or chemical solutions. Coatings which contain residual solvents fail prematurely as compared to coatings that have dried adequately. (7) Metal preparation must be considered since, like all coatings, the best results will be obtained by the best techniques of sandblasting and cleaning.

In summation, we believe that one objective is common to the user, the paint manufacturer and the polymer supplier: the greatest progress will be made only if the application in mind is logically sound.

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NATIONAL STARCH: **Dr. A. I. Goldberg** and **Otto B. Wurzburg, Jr.** have been advanced to Associate directors of research. . .**Fred Eastman** has been appointed superintendent of process development.

HERCULES: **William R. Stevens,** assistant treasurer, retired January 31 after 37 years of service to the company.

FOREMOST FOOD and CHEMICAL: Two new sales agents have been appointed by the company and its El Dorado Division to represent in the sale of coconut oil fatty acids, methyl esters, Defoamer ED, and other products. The new sales agents are **Harry Holland & Son,** Detroit, exclusive sales agent in Michigan and northwestern Ohio, and **Howard Dock,** Cincinnati, exclusive sales agent in southern Ohio and Eastern Kentucky.

J. H. DAY: **Ronald W. Schmitt** has been made sales agent. His territory includes lower Connecticut and eastern New York state, exclusive of New York City.

AMERICAN MINERAL SPIRITS: **Kenneth D. Naumann** has been appointed sales representative and will work out of the midwest in the marketing of the company's complete line of technical naphthas and petroleum solvents.

CLIMAX MOLYBDENUM: **Benjamin H. Danziger** has been appointed manager of advertising and promotion.

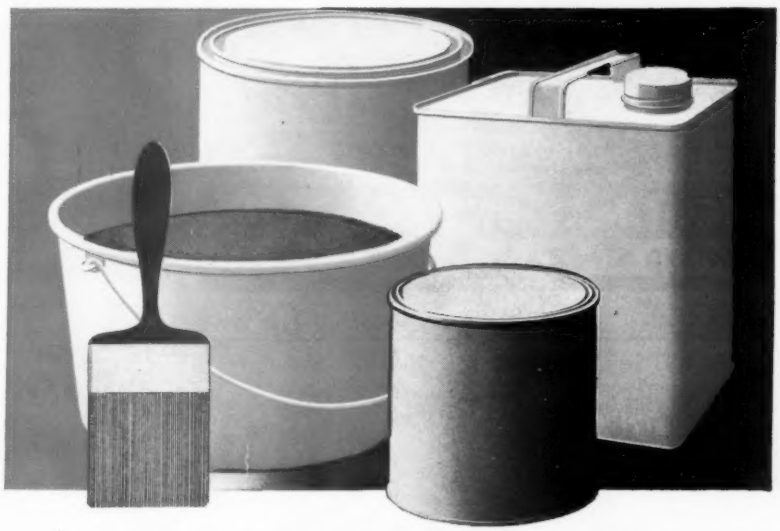
UNION CARBIDE: **H. E. Klein** and **G. A. Trigaux** have been appointed product managers in the fine chemicals department. Mr. Klein will be responsible for the market development of resin chemicals. Mr. Trigaux will be responsible for the market development of Oxo process chemicals.

BAKELITE: **Dr. Richard W. Quarles** has been named an assistant director at the development laboratories at Bound Brook, N. J. and will head up the chemical division. . .**John D. Benedito** has been appointed sales manager succeeding **H. K. Intemann,** who has been named executive vice president of Electro Metallurgical Co.

D. H. LITTER: **John G. Pappas** has been appointed senior chemist and will specialize in the evaluation and formulation of latex and emulsion paints. . .**Harvey Galan** has been appointed junior chemist to assist in the preparation of specialized coatings for the armed services.

MAUTZ PAINT & VARNISH: **John Uhlarik** has been made branch sales manager.

CELANESE: **William G. West** will head the newly created department for the sale of copolymer and homopolymer polyvinyl acetate emulsions.



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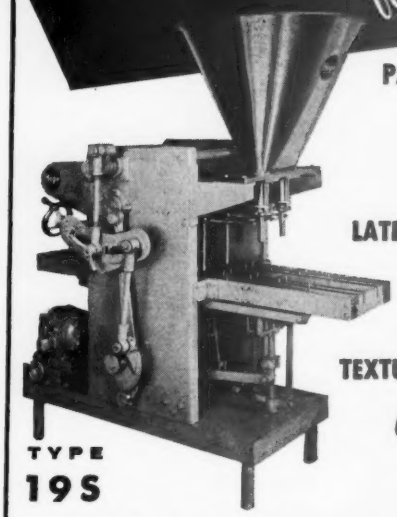

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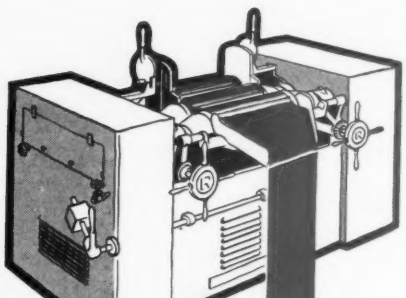

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BAKELITE

ORONITE CHEMICAL: Norman E. Hathaway has been appointed coordinator of marketing. Appointments of three new regional sales managers were also announced: **W. M. Burge** will head up the midwestern region with headquarters in Chicago . . . **J. R. Stitt** was named eastern regional sales manager with headquarters in New York. . . **T. M. Welton** has been made western regional sales manager with headquarters in San Francisco.

HILTON-DAVIS: Gustav Gurska, Jr. has been appointed manager of the new branch sales office in Boston which will distribute the company's complete line of flushed and dry colors, as well as provide customers with technical assistance in solving color problems. Office will service Massachusetts, Maine, New Hampshire, Vermont and Connecticut.

UNION CARBIDE: A. K. Doolittle has been appointed senior scientist in the research department and will direct a broad program of basic research in liquid-state physics. Several changes in the industrial chemicals sales organization have been announced: **M. W. Duncan** has been appointed district manager of the Kansas City District. . . **T. F. Grady** has been transferred to the Denver sales office as technical representative . . . **R. E. Gustafson** has been appointed technical representative in the Chicago district. . . **M. H. Mackay** has been transfereed to the Chicago district office as an inside salesman.

WATSON-STANDARD: Walter J. Kaufman becomes manager of the technical division.

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JAMES B. SIPE and CO.: Herman J. Kasch has been appointed vice president and has been elected to the board of directors.

KINETIC DISPERSION: Eugene Hiller has been appointed general manager of research and production and **Donald Hazen** has been appointed production manager.

SHAWINIGAN RESINS: Arnott Morange has been made a sales representative attached to the Los Angeles district office. He will be located in the San Francisco Bay area.

SPENCER KELLOGG and SONS: Herbert M. Schroeder has been appointed group leader in drying oils at the company's research center in Buffalo, N.Y.

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McCLOSKEY VARNISH: Everett Heuer, exclusive sales representative for the Long Island, N. Y. territory for the past five years, has requested and received a transfer to the eastern Pennsylvania territory. . **.Louis Kenderine** will continue as a general representative in that territory. . . **Raymond A. Lombardi** will handle the Long Island territory.

UNION BAG & PAPER: A. B. Doran has been appointed director of chemical sales.

DEVOE & RAYNOLDS: Carl McFarlin, Sr., chairman of the executive committee, was elected president of the company. . **.Alexander Rittmaster** was elected a director.

GLIDDEN: Milton D. Roth has been made manager of the Tampa, Florida branch operation. . **.John W. MacLeod, Jr.** becomes industrial sales representative in the State of Alabama.

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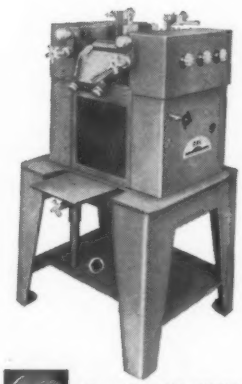

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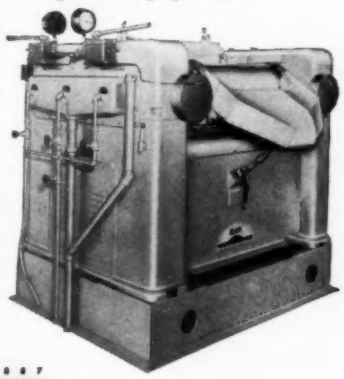

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IMPACTS TESTS

(*From page 47*)

with pre-treatment Types A and C were still in relatively good general condition, except for the localized failure at the points of initial damage. From a practical standpoint, therefore, phosphate pre-treatment Types A and C appear comparable in that initial local damage did not accelerate general failure.

F. In view of the above statements, it is interesting to note the similar behavior of two phosphate pre-treatments of different chemical composition and different coating weight. The results indicate that up to 763 hours of salt-fog exposure, and under the test conditions specified, the zinc phosphate compound, Type A, and the iron phosphate compound, Type C, tend to produce equivalent resistance to the combined effects of impact and salt-fog exposure, in spite of their different coating weights, chemical compositions, and in spite of the different initial behavior to impact. The earlier failure of those panels having phosphate pre-treatment Types B and D would all be improved if they were applied to the steel in a heavier coat. The determination of the minimum coating weight requirement of the various metal phosphate pre-treatments, however, is still under development, and this question is beyond the scope of the present paper. It is evident that the long time effects of impact damage and salt-fog exposure are closely related. In specifying pre-treatments for impact resistance in practice, recognition must be given to the basic salt-fog exposure characteristics of the coating system.

G. Differences in salt-fog resistance of seven inch impacted panels as compared to fourteen-inch impacted panels again are closely related to the spreading characteristics of the pre-treatment plus paint system. In the present series of tests, only limited differences could be seen.

H. Although salt-fog damage did not appear to be accelerated on those portions of the panels which were pre-treated and then impacted before painting, as compared to the general resistance of the non-impacted areas, it was not possible to confirm this observation because of the small total test areas of the panels used for this purpose. In order to obtain more specific information on this point it would be necessary to conduct experiments on a larger scale.

I. It was noted in item I-A of the test results above, that the convex sides of the impact test areas were more severely damaged than the concave sides. It would be expected that this difference should become less pronounced as the time of exposure to salt-fog is increased, because under the present test conditions any break in the film which allows moisture spreading will, in the long run, have a similar effect irrespective of its origin, and will depend primarily upon the spreading resistance of that system. Thus it was observed that after about 600 hours of salt-fog exposure, the two sides were roughly equivalent for most panels. Prior to 400 hours exposure, the convex sides invariably were in poorer condition than the concave sides, because of the more severe initial damage to the convex sides.

J. As the salt-fog exposure tests were continued for longer periods, the effects of impact became less clearly defined due to the general progressive failure of the coating systems. Although the experiments were continued as long as 906 hours for the purpose of record, all conclusions are based on the observations up to 763 hours, which was quite adequate to assess the relative performance of the different systems. At the end of 906 hours exposure to salt-fog, all panels were in poor condition.

In conclusion, methods have been developed and applied to four groups of zinc and iron phosphate pre-treatments, for the purpose of studying the impact resistance of coating systems. These systems consisted of a steel surface, which was pre-treated with a metal phosphate and then painted with an organic coating. By means of the electrographic print technique, permanent records have been obtained, which have been found to agree well with direct visual evaluation of the test panels.

A method of comparing the results of the electrographic printing records by measuring their change in reflectance during the salt-fog exposure of the panels has been described. It was observed that in these variations, shown in Figures 3 to 6, there is a similarity between the panels of treatment A and C, that is of a zinc phosphate with a coating weight of about 150 mg/sq.ft. and an iron phosphate with a coating weight of about 67 mg/sq.ft. The same tests show that lower coating weights, such as in treatments B and D, show from the test cross and from the impact areas a speedier effect of the salt-fog exposure.

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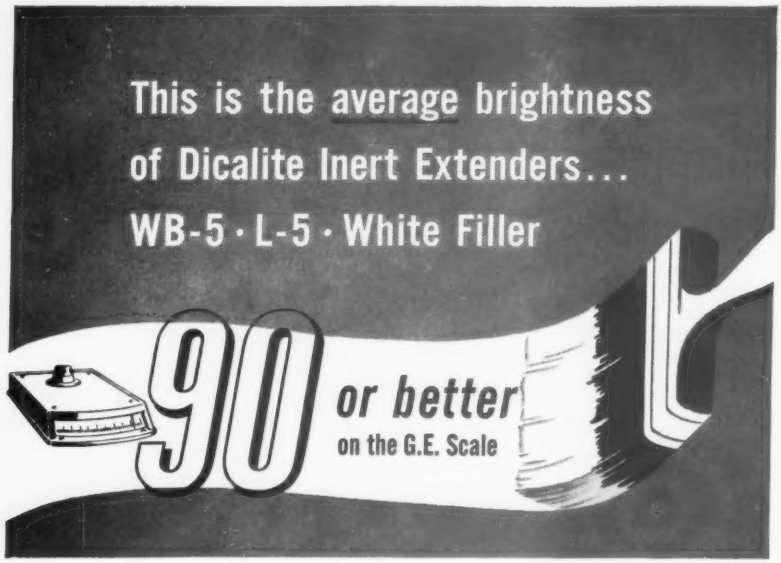

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CALENDAR OF EVENTS

Mar. 22-24. Spring Symposium and Raw Material Exhibit of the West Coast Paint and Varnish Production Clubs, Statler Hotel, Los Angeles, Calif.

April 8-13. ACS Spring Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Dallas, Tex.

April 23-24. American Oil Chemists' Soc., Shamrock Hotel, Houston, Tex.

May 10-12. Southwestern Paint Convention, Joint Dallas and Houston Paint and Varnish Production Clubs Meeting, Statler-Hilton Hotel, Dallas.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, College Inn.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

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Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

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PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Asphalt Compositions

U. S. Patent 2,728,682. Mathew L. Kalinowski, Chicago, and Lowell T. Crews, Homewood, Ill., and Frederick H. MacLaren, Munster, Ind., assignors to Standard Oil Company, Chicago, Ill., a corporation of Indiana.

A bitumen composition consisting essentially of a major proportion of a bitumen and from about 0.25% to about 5% of the oil-soluble reaction product essentially free of amido groups obtained by reacting an aliphatic polyamine and a carboxylic acid pitch selected from the group consisting of tall oil pitch and hydrogenated fish oil fatty acid pitch at a temperature of from about 180° F. to about 265° F. for not more than about one and one-half hours, and then rapidly reducing the temperature to below about 170° F.

Resins Prepared From Unsaturated Ketones

U. S. Patent 2,726,228. Ralph B. Thompson, Hinsdale, Ill., assignor to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A process for the production of a resin which comprises reacting at condensation reaction conditions and in the presence of a basic condensation catalyst a pentadienone having the structure of a di-alpha, beta-olefinic ketone with an organic compound containing a dihydrogen-substituted carbon atom adjacent to a radical selected from the group consisting of carboxyl, carbonyl, carboalkoxy, cyano and nitro and thereafter heating the resulting condensation product to a temperature of from about 200° to about 300° C. to form said resin.

Wax Composition

U. S. Patent 2,728,735. Alvin P. Anderson, Woodcliff Lake, N. J., assignor to Shell Development Company, Emeryville, Calif., a corporation of Delaware.

As a new composition of matter, a wax composition consisting essentially of between about 1% and about 20% by weight of a paraffin wax of crystalline structure having a melting point between about 165° F. and about 195° F. between about 0.05% and about 20% by weight of a polymerized olefin having a molecular weight greater than about 1,000 and at least 60% by weight of a paraffin hydrocarbon wax of a crystalline structure having a melting point between about 110° F. and about 150° F.

Polishing Compositions

U. S. Patent 2,733,154. Edward Roy Taylor, Jr., Springfield, Pa., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del., a corporation of Delaware.

A non-aqueous, liquid polishing composition comprising 0.5 to 15.0% water-insoluble wax, 0.5 to 15.0% hydrocarbon-soluble liquid polysiloxane, 0.4 to 4.0% water-insoluble metallic soap, 65.0 to 98.4% hydrocarbon solvent for the wax, and .02 to 1.0% of an organic amine selected from the group consisting of diethylethanol amine, N-aminopropyl morpholine, 2-ethyl hexyl amine, morpholine and n-butyl amine, said amines having the property of preventing the formation of non-dispersible seeds in said composition at temperatures as low as 0° F.

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Modified Paraffin Wax Grease Resistant Coating

U. S. Patent 2,733,225. Monroe F. Smith, Walnut Creek, Calif., assignor to Fibreboard Products Inc., San Francisco, Calif., a corporation of Delaware.

A modified paraffin wax grease resistant coating composition for paperboard or the like comprising a major proportion of paraffin wax and minor proportions of solid polyethylene and microcrystalline wax having a melting point of at least about 180° F., the total amount of said paraffin wax and said microcrystalline wax in said composition comprising at least about 80% by weight of the total weight of the composition, the paraffin wax being present in an amount constituting at least about 90% by weight of the total amount of said microcrystalline wax and said paraffin wax, the microcrystalline wax being present in an amount sufficient to counteract the scuffing effect of said polyethylene but not exceeding about 10% by weight of the total amount of said microcrystalline wax and said paraffin wax, and the polyethylene being present in an amount sufficient to counteract the frictional drag effect of said microcrystalline wax.

Polyamide Dispersion Coating

U. S. Patent 2,731,432. Harry A. Toulmin, Jr., Dayton, Ohio, assignor to Midland Chemical Corp., Wilmington, Del., a corporation of Delaware.

A liquid coating composition comprising a dispersion of a particulate polyamide having the amide groups thereof as integral members of the polymer chain, a molecular weight of at least 5,000 and an average particle size such that at least 90% of the particles are capable of passing through a 100 to 400-mesh Tyler sieve, in an aqueous solution of from about 20% to about 40% by weight of an alkali metal silicate having an XO_2 to SiO_2 ratio between about 1:1.7 to 1:3.9, X representing the alkali metal, the amount of particulate polyamide in the composition being between about 5 lbs. and 18 lbs. thereof per gallon of the aqueous alkali metal silicate solution.

Freeze Resistant Aqueous Paint Containing an Arylsulfonamide

U. S. Patent 2,731,433. Paul H. Johnson, Akron, Ohio, assignor to The Firestone Tire & Rubber Co., Akron, Ohio, a corporation of Ohio.

A water paint containing an oil-in-water emulsion polymer, of a polymerizable ethylenically unsaturated compound, and about 5 to 60% based on the weight of polymer of an aryl sulfonamide selected from the group consisting of p-toluenesulfonamide and p-phenylene dibenzenesulfonamide, said paint having improved freeze-stability.

The man who couldn't be sold!

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So we plopped the ACINTOL Bulletin down on his bench. As we leafed through it, pointing out charts and tables giving detailed analyses of every ACINTOL Tall Oil Product and outlining profitmaking formulations, he put his hands over his eyes.

So we picked up our briefcase in despair. Then he said, "Give me a sample," and proceeded to run a series of exacting tests right before our eyes.

"You still can't sell me a thing," he finally said through the maze of glassware. "I've just sold myself. From now on, consider ACINTOL Fatty Acids standard in our formulations—and I plan immediately to look into ACINTOL Distilled Tall Oil."

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Synthetic Drying Oils

U. S. Patent 2,733,267. Donald F. Koenecke, Westfield, N. J., assignor to Esso Resear.h and Engineering Co., a corporation of Delaware.

A process for improving the hardness of films prepared from polymeric drying oils which comprises first reacting the oil at a temperature between 50 and 250° C. with from 0.01% to an amount which will cause gelation of a reagent selected from the group consisting of maleic acid, fumaric acid, thioglycolic acid, thiosalicylic acid, mercaptophthalic acid, itaconic acid, mesaconic acid, citraconic acid, acrylic acid and the esters and anhydrides thereof, then reacting the resulting product with about 0.1 to about 1 mole per mole of available carboxyl groups of an organic compound containing at least two functional groups one of which is selected from the group consisting of primary and secondary amines and the other is a hydroxyl group, and finally treating the resulting product with an acid compound chosen from the group consisting of mono, di and trichloroacetic acid, trifluoroacetic acid, glacial acetic acid, and soluble sulfonic acids.

Preparation of Isopropanol of Improved Odor Quality

U. S. Patent 2,729,682. Henry O. Mottern, Bloomfield, N. J., assignor to Esso Research and Engineering Co., a corporation of Delaware.

In a process of producing isopropanol by hydration of a propylene hydrocarbon feed which contains impurities normally giving rise to mercaptan odor and also contains less than 0.2 percent of C_4 to C_6 mono-olefinic hydrocarbons, the improvement of minimizing mercaptan odor which comprises adding to said propylene feed enough of a C_4 to C_6 mono-olefinic hydrocarbon to produce a modified propylene feed containing 0.5 to 5 weight percent of said C_4 to C_6 mono-olefinic hydrocarbon, absorbing said modified propylene feed in sulfuric acid of 60 to 95 weight percent strength to produce an acid extract, hydrolyzing the extract to produce crude isopropanol containing low boiling impurites and simultaneously reacting the C_4-C_6 olefin with the odor-causing impurities to convert them to high boiling impurities boiling as high as 250-300° C., introducing the crude isopropanol into a point near the mid-section of a distillation zone, introducing water to an upper portion of the distillation zone in amounts sufficient to maintain a water concentration of 70 to 99 mol percent in the liquid phase in the distillation zone, applying heat to the distillation zone to distill therefrom vapors which rise countercurrently to the downflowing aqueous reflux, removing overhead from the distillation zone low-boiling and high-boiling impurities including impurities normally giving rise to mercaptan odor and removing from the bottom of said distillation zone a dilute aqueous isopropanol substantially free of mercaptan odor.

Freeze Resistant Aqueous Paint Containing a Hydrazine Derivative

U. S. Patent 2,731,434. Paul H. Johnson, Akron, John H. Musch, Silver Lake, and Cullen W. Metzger, Massillon, Ohio, assignors to The Firestone Tire & Rubber Co., Akron, Ohio, a corporation of Ohio.

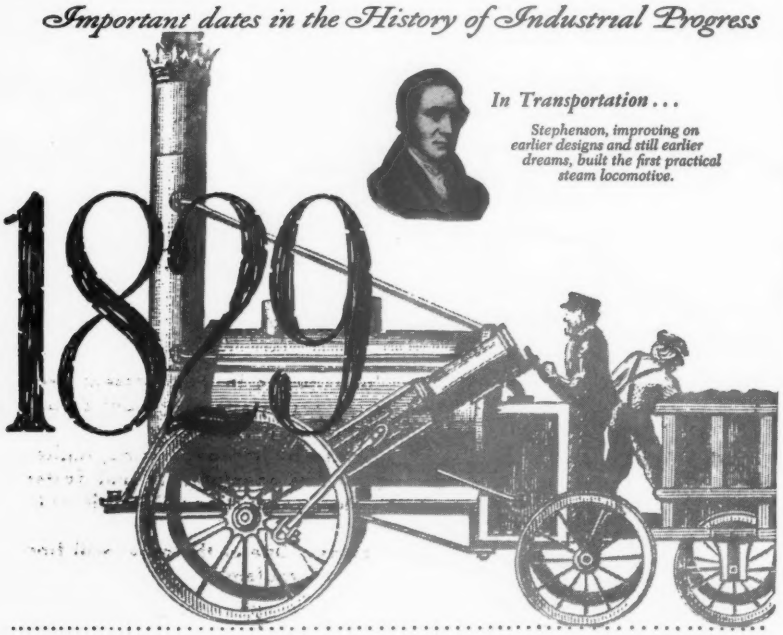
A paint of improved freeze-stability containing an aqueous oil-in-water emulsion polymer of a polymerizable ethylenically unsaturated compound and about 2 to about 10% based on the weight of polymer of a compound selected from the group consisting of hydrazine hydrate and alkyl, cycloalkyl, aralkyl, aryl and alkylene substituted hydrazines.

Coating Material Resistant To Deterioration and Chalking

U. S. Patent 2,731,354. Ralph J. Wirshing, Detroit, Mich., assignor to General Motors Corp., Detroit, Mich., a corporation of Delaware.

A protective and decorative coating material for use as an exterior gloss finish on automobiles and similar articles which are exposed to moisture and sunlight during normal usage, said coating material consisting predominantly of an organic vehicle selected from the group consisting of the natural and synthetic resins, the drying oil modified syntehtic resins, the drying oils, and mixtures thereof, a pigment material selected from the group consisting of titanium oxide, zinc oxide and mixtures thereof, from about .25% to 10% by weight of

Important dates in the History of Industrial Progress



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In the history of fats and waxes

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Color 5¼" Lovibond Red	2.5 max.
Color 5¼" Lovibond Yellow	15 max.
Color Gardner 1933	2 – 4
Unsaponifiable	0.25% – 0.50%
Saponification Value	251 – 258
Acid Value	250 – 257
Iodine Value (WIJS)	7 – 15

Lefevre observed that tallow under the influence of sulfuric acid and supplemented by coconut oil yields fatty acids. Just eight years later, A. Gross & Company began to manufacture fatty acids for industry. Today, the Coconut Fatty Acids made by A. Gross exemplify the high standards of quality which research and modern production techniques have made possible. Shown in the table are specifications for GROCO 26–STRIPPED COCONUT FATTY ACIDS from which a major portion of the lower acids have been removed. Send for samples and catalog "Fatty Acids in Modern Industry."

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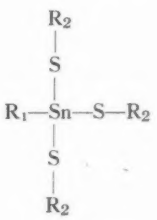
an oxidizing agent to inhibit corrosion and chalking from light and moisture, and sufficient organic solvent to render said coating material fluid for application to the surface to be coated, said oxidizing agent being selected from the group consisting of the alkali metal dichromates and the alkali metal permanganates.

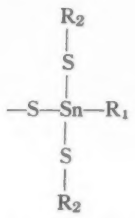
Stabilization of Vinyl Chloride Resins

U. S. Patent 2,731,440. Eugene P. Stefl, Churchill Valley, Pa., and Chris E. Best, Franklin Township, Summit County, Ohio, assignors to The Firestone Tire & Rubber Co., Akron, Ohio, a corporation of Ohio.

A resinous composition which is stable to heat and mechanical working, comprising a resin selected from the group consisting of polymers of vinyl chloride and copolymers thereof with other ethylenically unsaturated compounds copolymerizable therewith and containing at least 60% of vinyl chloride copolymerized therein, together with from 0.25% to 5%, based on the weight of vinyl chloride resin in the composition, of a compound of the formula



in which formula R_1, independently in each occurrence, represents an organic radical consisting of and containing from 1 to 22 carbon atoms, hydrogen, carbon-carbon single bonds, carbon-hydrogen bonds, up to 11 aromatic ring carbon-carbon double bonds, and up to 4 innocuous structures selected from the group consisting of carbon-carbon triple bonds, aliphatic carbon-carbon double bonds, ether linkages, thioether linkages, carboxylic ester groups bonded to carbon atoms, fluorine atoms bonded to carbon and halogen atoms bonded to aromatic ring carbon atoms, each R_1 being linked to the tin atom in the formulae hereinabove and hereinbelow by one of its carbon atoms, and R_2, independently in each occurrence, represents an organic radical consisting of and containing from 1 to 22 carbon atoms, hydrogen, carbon-carbon single bonds, carbon-hydrogen bonds, up to 11 aromatic ring carbon-carbon double bonds, and up to 4 innocuous structures selected from the group consisting of carbon-carbon triple bonds, aliphatic carbon-carbon double bonds, hydroxyl groups bonded to carbon, sulfhydryl groups bonded to carbon, ether linkages, thioether linkages, carboxylic ester groups bonded to carbon, carboxylic amide groups bonded to carbon, fluorine atoms bonded to carbon, haolgen atoms bonded to aromatic ring carbon and groups of the formula



under the same notation, each of the radicals R_2 being linked to its respective sulfur atom in the formulae by one of its carbon atoms.

Drying Composition Resistant To Gas Checking and Frosting

U. S. Patent 2,730,510. Hans Dannenberg, Berkeley, Calif., assignor to Shell Development Co., Emeryville, Calif., a corporation of Delaware.

A process for preparing a composition which is resistant to gas checking and frosting when hardened as a film which comprises mixing about 0.1% to 4% by weight of an alkaline earth metal salt of an alkyl hydroxy aromatic monocarboxylic acid containing at least 6 carbon atoms in the alkyl substituent with a driving ester of polymeric polyhydric alcohols having alternating aliphatic chains and aromatic nuclei united through ether oxygen and olefinically unsaturated fatty acid of 12 to 20 carbon atoms and an iodine number of at least 90.

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- Makes Universal Tinting Paste

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Organopolysiloxane Coating

U. S. Patent 2,732,320. Clement Joseph Guillissen, Uccle-Brussels, and Abraam Gancberg, Forest-Brussels, Belgium.

A process of providing on a supporting surface a firm, smooth, non-tacky coating of a hydrocarbon-substituted polysiloxane which comprises mixing, at substantially room temperature, a resinous, polymerizable, hydrocarbon-substituted polysiloxane varnish, wherein the hydrocarbon substituent is selected from the group consisting of the phenyl radical and alkyl radicals having from 1 to 10 carbon atoms, with a polymerization catalyst consisting essentially of an alkyl orthotitanate to form a mixture of said catalyst and said varnish, and before exposing said mixture to substantially higher temperatures applying a thin layer of said mixture to said supporting surface, and baking said layer of the polysiloxane and orthotitanate mixture on said supporting surface by subjecting said layer to a temperature below 150° C.

Drying Oil Product And Method of Producing

U. S. Patent 2,730,451. David Aelony, Minneapolis, Minn., assignor to General Mills, Inc., a corporation of Delaware.

Process which involves heating a conjugated drying oil with a benzodioxane 1-3, substituted in the 6-position with a hydrocarbon substituent containing from 1-10 carbon atoms, at temperatures of from 200-250° C. for from 30 to 60 minutes, the substituted benzodioxane being employed in a concentration of 5% to 40% based on the combined weight of the substituted benzodioxane and the conjugated drying oil.

Freeze Resistant Aqueous Paint Containing Guanidine Thiocyanate

U. S. Patent 2,731,435. Paul H. Johnson, Akron, John H. Musch, Silver Lake, and Cullen W. Metzger, Massillon, Ohio, assignors to The Firestone Tire & Rubber Co., Akron, Ohio, a corporation of Ohio.

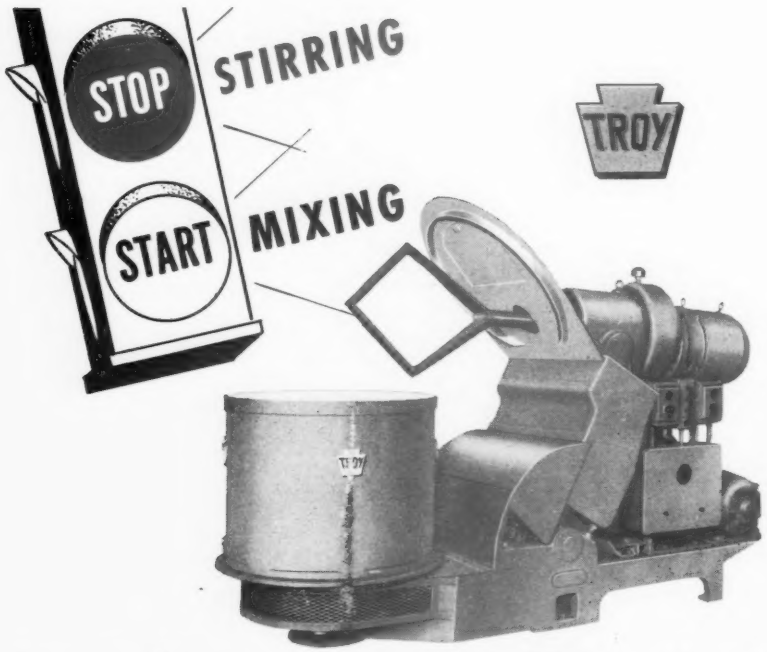
An oil-in-water emulsion paint containing a polymer of a polymerizable ethylenically unsaturated compound and a quantity of guanidine thiocyanate which is relatively small in relation to the quantity of said polymer, said paint having improved freeze-stability.

Vinyl Resins for Solvent Solutions Application

U. S. Patent 2,731,449. George P. Rowland, Jr., and Robert A. Piloni, Pottstown, Pa., assignors to The Firestone Tire & Rubber Co., Akron, Ohio, a corporation of Ohio.

A copolymer of	Per cent
Vinyl chloride	55–75
A dialkyl ester of an acid selected from the group consisting of maleic, fumaric, and chloromaleic acids containing 4–22 carbon atoms	14–35
A monoalkyl monohydrogen ester of an acid selected from the group consisting of maleic, fumaric, and chloromaleic acids containing 3–12 carbon atoms	5–10
Trichloroethylene	1.5–6.5

the percentages being based on the total weight of the copolymer.



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NEWS

Spencer Kellogg Opens New Research Center

Spencer Kellogg & Sons, Inc. formally opened its new Research Center Feb. 8 at Cheecktowaga, N.Y. It is located opposite the Buffalo Municipal Airport and is situated on a site of approximately five acres.

The Center consists of a research office and laboratory building and a pilot plant structure. The laboratory is equipped for research in vegetable oils in industrial and protective coating applications, edible oils and fats, and products derived from vegetable proteins.

The project also includes facilities for basic and analytical research, technical service to customers and supervision of plant quality control.

The pilot plant is equipped for semi-pilot production research in connection with new products and processes.

Dr. Malcolm M. Renfrew, who was appointed director of research last summer, heads the administrative staff at the Center.

Attending the formal opening ceremonies were, left to right, Dr. Malcolm M. Renfrew, Director of Research and Development: Dr. Alexander Schwarcman, Vice President and Director of Research, Emeritus: Howard Kellogg, Jr., President: Wilbur L. Lafean, Jr., Vice President.

Plan Enables Paint Firms To Finance Complete Lab

How a small or medium-sized paint company can arrange within 24 hours to finance the cost of a complete industrial laboratory for research, cost control, or product development was disclosed recently by the Chicago Apparatus Co., one of the nation's leading laboratory supply houses and originator of the plan.

J. O. Bengston, president said the plan is designed to enable small and medium-sized companies to establish or expand laboratory facilities, and thus meet competition.

Up to 75 per cent of the cost of equipment, apparatus, and supplies can be financed over a three-year period, Bengston said. Thus, he added, a purchaser of a $5,000 laboratory would pay only $1,250 in cash, with monthly payments less than $125. Up to 10 per cent of the total purchase can be expendable supplies, he said.

Bengston said Chicago Apparatus' Experience has been that most small laboratories can be set up for from $3,000 to $10,000.

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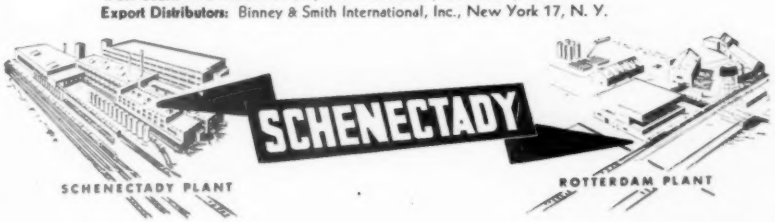
Export Distributors: Binney & Smith International, Inc., New York 17, N. Y.



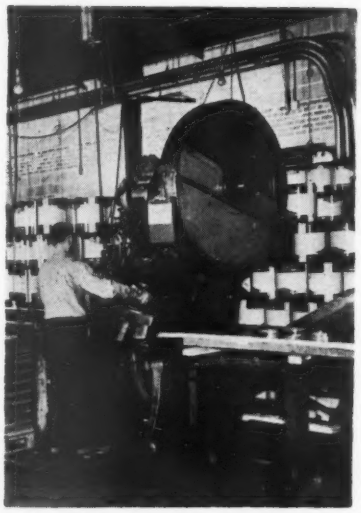
Vulcan Notes Progress On Its Third Birthday

When it opened its doors in 1952, Vulcan Steel Container Co., Birmingham, Ala., had an order book—but it was empty. Recently celebrating its third birthday, the company is in proud possession of a customer list that reads like a virtual "who's who" in the paint industry.

G. D. Zuck

How has the company, within the short period of three years, become a leading southern supplier of steel pails and drums? According to President Gordon D. Zuck, location has played an important part. Says Zuck, "By operating here in the 'Heart of Dixie,' we have been able to provide pails and drums to the fast growing industries of the South at a considerable savings in cost. Location has also made it possible for Vulcan to guarantee overnight delivery of pails and drums, thereby making it possible for plants to operate with small inventories."

The company has steadily expanded. Production and storage facilities have been tripled, and plans are underway for the addition of another railroad siding to provide larger and more diversified shipping facilities, more truck loading docks, and additional hi-speed machinery for greater daily production.



A section of the modern, high-volume production line at Vulcan.

A company specialty is hi-bake lined pails and drums which can be lithographed on its premises. Vulcan manufactures steel pails and drums in a full line of sizes and styles from 1 to 20 gallons, open head and drum type, hi-bake lined and lithographed, with plain lug covers or equipped with pouring spouts, with UPressit caps and seals or screw caps, with tamper-proof inner seals, with pull-up or flex-spouts.

•

Four Win Tall Oil Awards

The Tall Oil Division of the Pulp Chemicals Association has announced awards of $500, $350 and $100 to Robert S. Aries and Melvin Wolkstein of the Polytechnic Institute of Brooklyn, N.Y., Jacobus Rinse of Chemical Research Associates, and Paavo Kajanne of the Institute of Technology at Helsinki, Finland.

The top award of $500 went to Aries and Wolkstein jointly for their studies on the esterification of tall oil with glycerol. Rinse won second prize for his paper on aluminum tritallate, a new tall oil derivative. Kajanne took third prize for a paper tracing the changes in the composition of tall oil fatty acids from the time the pine tree is felled to the time the tall oil is produced.

New LOW Prices . . . See Your Colton Salesman

The "Sellingest" Paints are those offering the 6 Big Benefits of *VINAC* *FLEXBOND 800*

AN AIR REDUCTION PRODUCT

Copolymer Polyvinyl Acetate

Include Vinac FLEXBOND 800 in all your water base paints and watch your sales climb. The reason? Vinac FLEXBOND 800 Paint Vehicle adds these six distinct advantages:

1. **SCRUB RESISTANT**
   — Unequalled for wet scrub and adhesion
2. **FILM INTEGRITY**
   — Maintained even at low temperatures
3. **PERMANENTLY FLEXIBLE**
   — A resultant natural property of copolymerization
4. **WATER RESISTANT**
   — Fast-acting—as soon as dry
5. **IT BREATHES**
   — Avoids blistering and peeling by allowing moisture to pass through
6. **ODOR-FREE**

Is it any wonder that paints made with Vinac FLEXBOND 800 Copolymer Polyvinyl Acetate are *superior* paints . . . Push your paints up front with FLEXBOND 800.

Colton technical assistance, without obligation, is always available. Write now for free sample of Vinac FLEXBOND 800, data sheets, specifications and suggested formulations. Address Dept. F-3.

COLTON CHEMICAL COMPANY

COLTON

A Division of Air Reduction Co., Inc.
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Sales Offices and Warehouse Facilities Throughout U.S.

EXPORT: Airco Company International, New York 17, N. Y.

Products of other divisions of Air Reduction Co., Inc. include: AIRCO—industrial gases, welding and cutting equipment • PURECO—carbon dioxide, liquid-solid ("DRY-ICE") • OHIO—medical gases and hospital equipment • NATIONAL CARBIDE—pipeline acetylene and calcium carbide.

NEWS

S. B. Levinson

Morris Coffino

Two From D. H. Litter Address Coatings Lab

Sidney B. Levinson technical director and Morris Coffino, chief chemist of the D. H. Litter Co., New York, were guest lecturers at the Specialized Coatings Laboratory Procedures Course sponsored by the Newark College of Engineering.

They initiated the course by presenting the first three lectures of the series last month and early this month, discussing formulation and testing of trade sales coatings including exterior paints, interior finishes and latex paints.

At the end of each lecture the class prepared and evaluated typical formulations in the school laboratory.

•

Form Ultrasonic Group

Formation of the Ultrasonic Manufacturers' Association was recently announced. It will strive to promote dissemination of sound and accurate information about ultrasonic equipment and its applications. The group will assist also the industry in adopting ethical practices in sales, publicity and advertising, and will aid its members to secure clear and realistic rulings from governmental agencies.

•

"Dentolite" Franchise

The Denton Edwards Co., Ltd. has announced that "Dentolite," self-sterilizing paint, is now being made available for franchise to American paint manufacturers. The paint is claimed to render surfaces almost permanently germ-free, mold-free and fungus-free, and obviate the need for frequent painting.

Glycerine Capacity To be Increased by Dow

The Dow Chemical Co. will add substantially to its synthetic glycerine production capacity at its Texas division facilities, it has been announced by Donald Williams, vice president and director of sales.

The decision to increase capacity resulted from "the satisfactory operation of the company's new plant at Velasco, Texas, both as to process and product quality, plus a steadily expanding demand for synthetic glycerine," Williams said.

Dow started production of the material last summer in new facilities with a rated capacity announced at 36,000,000 pounds per year. The plant, which became the second synthetic unit in the world producing on a commercial scale, utilizes the company's own process with all raw materials for production being available at the Texas division.

•

Lechner Oiticica Oil Agent

Brazil Oiticica, Inc. of New York has announced the appointment of Carl A. Lechner Co. as representatives in Illinois, Indiana, Wisconsin and Iowa for the sale of "Cicoil," laboratory-controlled, uniform quality, raw liquid oiticica oil.

NOPCO offers 6 different ANTI-FOAMERS

. . . to make sure there's no foam in your latex paint

You simply can't rely on one anti-foamer to prevent costly foam in each different latex paint system—or in each plant.

Nopco's paint specialists, the first to concentrate on latex paints, today can completely eliminate foam from your latex paint, with an anti-foamer carefully selected for your plant, your system, your working conditions. Why not write them today?

Nopco Chemical Company, 546 Industrial Street, Harrison, New Jersey.

NOPCO

PLANTS: Harrison, N. J. Cedartown, Ga. • Richmond, Calif. London, Ont. Canada

One of these will make your latex paint foam-free
FOR BUTADIENE-STYRENE SYSTEMS Nopco 1407, Nopco 1497-V, Nopco 1907-B
FOR ACRYLIC RESIN SYSTEMS Nopco 1497-V, Nopco JMK
FOR POLYVINYL-ACETATE SYSTEMS Nopco JMY, Nopco JMU , Nopco JMK

NEWS

J. F. Kurfees, Sr., Founder Of Paint Firm, Dies at 89

James F. Kurfees, Sr., founder and chairman of the board of Kurfees Paint Co., Louisville, Ky., died late in January. He was 89.

The firm, one of the country's leading paint companies, had its start in a small retail paint store. In 1915 the company moved to its present location. In 1943, Mr. Kurfees relinquished his position as president to his son, James F. Kurfees, Jr., and became chairman of the board.

Kurfees officials said the company holds the distinction of originating a number of types of paints and enamels. Among these are alkyd-flat enamel; a nonbreathing, blisterproof paint; a quick-drying floor enamel, and a ready-mixed aluminum enamel.

Mr. Kurfees was well liked by his employees. He was one of the first employers in the nation to set up a bonus system for employees. The bonus has averaged 10 per cent of the total annual wage since it was started in 1917. The Kurfees company also was one of the first firms to set up a group insurance plan for its employees.

Mr. Kurfees was a past president of the Louisville Paint Association, a past vice president of the southern zone of the National Paint, Oil and Varnish Association, and a past president of the American Paint and Varnish Manufacturers Association. The latter two organizations are now part of the National Paint, Varnish and Lacquer Association.

•

Growth of Alkyd Resins Laid to New Technology

Alkyd resins have found their way into practically every paint and varnish product manufactured today, either as the entire vehicle composition or as part of the vehicle in combination with other film formers. This was the assertion made by Oscar P. Muller, assistant trade sales manager for industrial paints, varnishes and protective finishes, National Lead Co., New York.

Mr. Muller, who is chairman of the Vehicle Manufacturers' Committee of the New York Paint, Varnish and Lacquer Association, spoke on "New Developments in Alkyd Resins" at the annual meeting of the Association of American Soap & Glycerine Producers, Inc. which met Jan. 25-27 at the Waldorf Astoria Hotel in New York.

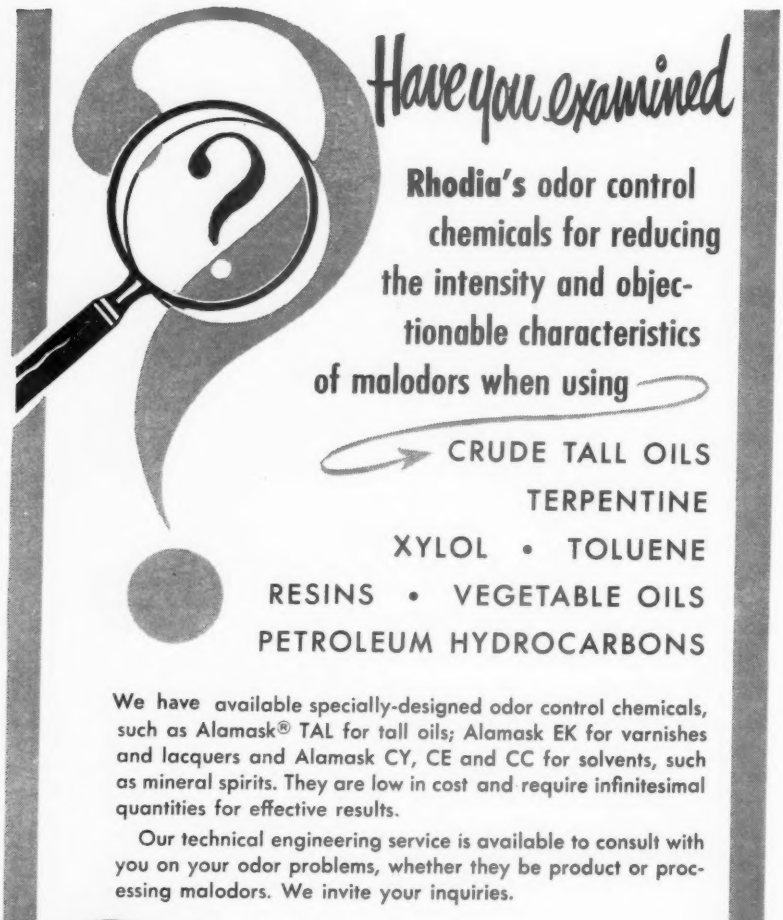
According to Mr. Muller, new modifiers and further advances in fundamental knowledge are responsible for the wide acceptance of alkyds by the paint industry.

•

80th Anniversary Year

Maas & Waldstein Co., Newark, N.J., manufacturers of lacquers, enamels and specialized finishes, is now celebrating its 80th anniversary year.

A two-day sales conference for technical service personnel recently brought together 43 representatives from principal cities throughout the nation for orientation on the anniversary year sales program, new research developments and promotional planning. A similar orientation meeting launched the sales and advertising program for more than 100 "Plextone" distributors. "Plextone" is the company's popular multicolored, textured enamel used in buildings and on a multitude of manufactured products.


Have you examined
Rhodia's odor control chemicals for reducing the intensity and objectionable characteristics of malodors when using
CRUDE TALL OILS
TERPENTINE
XYLOL • TOLUENE
RESINS • VEGETABLE OILS
PETROLEUM HYDROCARBONS
We have available specially-designed odor control chemicals, such as Alamask® TAL for tall oils; Alamask EK for varnishes and lacquers and Alamask CY, CE and CC for solvents, such as mineral spirits. They are low in cost and require infinitesimal quantities for effective results.
Our technical engineering service is available to consult with you on your odor problems, whether they be product or processing malodors. We invite your inquiries.
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NEWS

PDCA Meeting Predicts Another "Year of Plenty"

The 72nd Annual National Convention of the Paint & Decorating Contractors of America ended on a note of high optimism as President William Gelfan predicted that 1956 would be "a year of plenty in the painting contracting industry." The meeting was held last month in Washington, D.C.

Highlighting the program was a session "This Is Color," a dramatic presentation of home fashions by an eminent group of color and decorating authorities. The color program was sponsored by the Martin-Senour Co., Chicago paint manufacturers and color system experts. It was directed by William M. Stuart, president of the company. Presenting a series of eight palettes of color and design fashion were the following panel of experts:

Edith Brazwell Evans, editor-in-chief, *LIVING For Young Homemakers;* William Pahlmann, head of William Pahlmann Associates, Inc., interior designers; Kenneth R. Volz, director of design, Henredon Furniture Industries; Margaret Hutchison, color stylist, the Martin-Senour Co.

•

Union Bag Tall Oil Plant

Union Bag & Paper Corporation has announced that its new tall oil distillation plant in Savannah, Ga. will start operation this month. Union will offer a complete line of tall oil products, including crude tall oil, acid-refined tall oil, distilled tall oil, tall oil pitch, fatty acids and rosin.

•

New Heyden Plant

Heyden Chemical Corp., has begun construction at Fords, N.J. of a new plant with annual capacity for 25 million pounds of pentaerythritol, it was announced by Simon Askin, president.

The new plant, which will produce pentaerythritol by a new, improved process, is being erected adjacent to the present Heyden Fords, N.J. plant.

Propionaldehyde Available

Propionaldehyde produced at its large new Oxo unit at Texas City, Texas is now being supplied in tank car quantities, according to an announcement by W. A. Woodcock, manager, fine chemicals department, Carbide and Carbon Chemicals Co. Propionaldehyde is a broadly useful chemical raw material with applications that parallel those of acetaldehyde.

•

R. T. Freeman Co. Is Agent

The R. T. Freeman Co., Boston, is now representing the C. J. Osborn Co., Linden, N. J. in the New England territory for its entire line of pigments, dispersed pigments, and synthetic resins.

Tall Oil Popularity Rises

Increasing customer demands for tall oil products and tall oil rosins indicate a 20 per cent sales increase for Arizona Chemical Co. in 1956, Richard E. Sumner, president, told the organization's sales force at its two-day meeting in its two-day meeting in New York City recently.

"For the industry as a whole, crude oil production will approach 300,000 tons when the figures are all in for 1955. This compares with 200,000 tons in 1954, and 170,000 tons in 1953. We are fast approaching the point where production will hit the 1,000 ton a day production," Mr. Summer asserted.

• Midas Gold 6289 offers the greatest tolerance for polar systems of R-B-H's line of Midas Gold dispersions. It provides, as well, the values of all Midas Gold dispersions:

—A transparent, rich golden color • Extreme lightfastness • Ultraviolet absorption • Non-bleeding • Uniformity of color • Dispersion in straight solvent (providing wide latitude in choice of binders and plasticizers).

R-B-H . . . *for finishes of integrity.*

R-B-H *Dispersions*

DIVISION OF INTERCHEMICAL CORPORATION
DISPERSION TECHNICIANS
BOUND BROOK, NEW JERSEY

Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.

R-B-H IS A TRADE-MARK OF INTERCHEMICAL CORPORATION

New Book

Process Control

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 228 pages. Price $6.75.

"Automatic Process Control for Chemical Engineers" by Norman H. Ceaglske offers a basic and systematic approach to the analysis and design of chemical engineering unit operations, linking the application of servomechanism principles directly to chemical process control.

Departing from the purely descriptive treatment usually accorded this subject, Dr. Ceaglske focuses on basic principles which he shapes into elementary form and demonstrates with applications to a few simple control systems. He also presents the methods for calculating the dynamic response of processes, a topic unfamiliar to many chemical engineers.

The first chapter of the book is introductory in nature and includes a brief history of automatic control. Entirely descriptive, the second chapter first covers the action of each part of the control system and then the action of the complete control system. Dr. Ceaglske then embarks on his mathematical analysis, with each chapter covering a specific phase, namely: derivation of equations, solutions by the standard methods of differential equations, transient analysis of control systems, frequency response of control systems, and the analysis of simple control systems.

Professor Ceaglske is in the department of chemical engineering at the University of Minnesota. He was previously at other leading teaching centers, and has engaged in research for several well-known industrial concerns.

Let's talk about

METHYL GLUCOSIDE—THE CYCLIC POLYOL

FOUR reactive hydroxyls and low cost are Methyl Glucoside's biggest drawing cards.

The cyclic polyol MG can be esterified by:

- direct esterification
- transesterification
- reaction with acyl halides, acyl anhydrides

Tall oil and drying oil fatty acid esters of MG make excellent coating vehicles.

MG diesters and triesters of long chain fatty acids are outstanding as nonionic surface active agents.

MG is used for alcoholysis of triglycerides in the manufacture of specialty alkyds. Oil-modified tetrahydrophthalic, adipic or sebacic MG alkyds are new and different. . . . And these are just a few of the many esterifications possible with MG.

Summed up, the versatility of the four hydroxyls of MG offer a wide range of chemical possibilities. Let MG go to work for you . . . improve performance, lower cost, broaden your markets . . . Contact us today. We'll supply you with samples, information and technical know-how.

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TALL OIL ESTERS
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LETTER TO PUBLISHER

The following letter was received in connection with the article, "Developments in Steel Containers Solve Shipping Problems," which appeared on page 33 of the January issue. As Mr. Smith requests, we are publishing his letter in its entirety.

Mr. John Powell
Powell Magazines
855 Ave. of Americas
New York, N. Y.

Dear Mr. Powell:

We have just read your article in the January issue of Paint and Varnish Production entitled "Development in Steel Containers Solve Shipping Problems," which highlights a program instituted last year by new drum manufacturers to identify their product with the "Red-S label."

We question the inference in your article with reference to the "regulatory" nature of paint products, wherein you infer that such products may be shipped in "new drums." This is not true.

Under Section 73.28 (h) of the "Agent H. A. Campbell's Tariff No. 9" it is clearly stated that drums may be reused for certain regulatory products when reconditioned.

For your further information we enclose a press release first issued when the "Red-S label" program by the Steel Shipping Container Institute carried these same references.

We would be happy to afford you, or a member of your staff, an opportunity to visit a modern reconditioning plant; and to develop content for your magazine on the subject of the Reconditioned Steel Drum. It is hoped that it would receive the same attention and recognition afforded the presently referred to article.

M. A. SMITH
Executive Secretary
National Barrel and Drum Association, Inc.
Associations Building
1145 19th Street N.W.
Washington 6, D. C.

TECHNICAL Bulletins

NEW PRODUCTS

The Nopco News, first of a series of quarterly product bulletins, has been issued by the Market Development Department of the Nopco Chemical Co. The bulletin is devoted to new company products developed for a specific market, but having widespread applicability to other industries.

Included in the issue are: "Nopco GS-10," a hydroxylated aliphatic amide that has physical properties similar to glycerine; "Nopco 1525-L," a 100 per cent active liquid surface active agent of the nonionic type. It is a polyoxyethylene ether of an alkylated phenol polymer; "Nopcoset B," a modified polyvinyl acetate emulsion of the anionic type; and "Nopco 2221-P," a modified ester of castor oil.

INDUSTRIAL COAL DUST

Wheelabrator Corp., 1231 S. Byrkit St., Mishawaka, Ind., has published booklet 551-D on the control of dust from coal handling operations. It discusses the use of local exhaust ventilation and cloth-tube-type dust collectors. Four illustrated case histories are presented. Some diagrams of materials handling systems and how dust control is exercised in them are presented.

FATTY ALCOHOLS

"Survey of Cachalot brand Fatty Alcohols," a new 12-page booklet is available from M. Michel and Company, Inc., 90 Broad St., New York 4, N. Y. It describes a large line of straight-chain aliphatic alcohols, includes over 100 uses for Cachalot C12 to C18 higher alcohols as intermediates and additives in the chemical processing industries, shows typical reactions, infrared spectra, and solubility charts.

PETROLEUM DISTILLATION

Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill., has published Bulletin 716 on its "Front-View" distillation units for petroleum products. This 4-page illustrated brochure discusses construction and operational features of the various models offered—the ice, water, and mechanically-refrigerated units, each in several sizes—with particular emphasis on the "Lo-Cap" heater, a new heating unit whose low mass is said to afford rapid heating and cooling, assuring instantaneous response.

ACRYLONITRILE

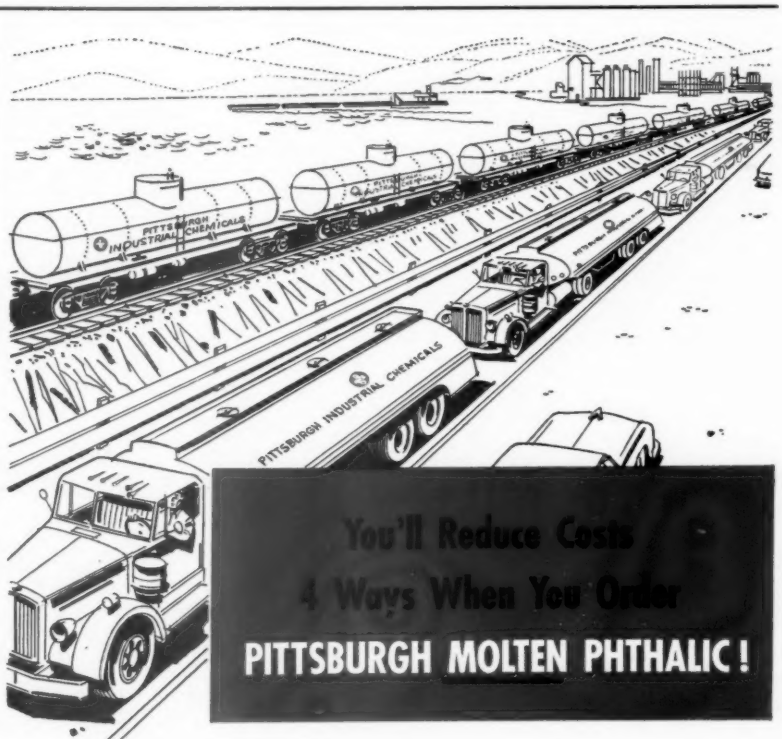
"Acrylonitrile in Surface Coatings," technical bulletin PD 6, has been released by American Cyanamid Co., Petrochemicals Dept., 30 Rockefeller Plaza, New York 20, N. Y.

The bulletin discusses polyacrylonitrile and acrylonitrile copolymers such as styrene-acrylonitrile and butadiene-acrylonitrile and their use in various coating applications. A bibliography is included.

HYDROABIETYL ALCOHOL

Improved interior gloss enamels, through the use of "Abitol" (hydroabietyl alcohol), is the subject of bulletin S-101 available from Hercules Powder Co., Wilmington 99, Del.

Gloss enamels based on soya fatty acid alkyds modified with product exhibited noticeable improvement in gloss retention after eight years' interior exposure to industrial atmospheres, the bulletin claims. Pentaerythritol, glycerin, and glycerin-PE blends were used as the polyols in the preparation of the alkyds.



You'll Reduce Costs 4 Ways When You Order PITTSBURGH MOLTEN PHTHALIC!

USERS of phthalic anhydride in flake form specify *Pittsburgh* because they like the uniform quality, reliable deliveries and the convenience of *Pittsburgh* "Quick-Open" bags. But if you have facilities for receiving tank truck or tank car shipments of *Pittsburgh* Phthalic Anhydride in *molten* form, you'll enjoy these important cost-saving advantages, too:

1. Lower cost-per-pound.
2. Lower handling costs.
3. Less warehousing and inventory space.
4. Reduced processing time.

And remember: *Pittsburgh* is *doubling* its phthalic output this year . . . greater assurance than ever of *prompt* deliveries in *any* quantity when you buy from *basic Pittsburgh!*

PITTSBURGH COKE & CHEMICAL CO.

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

According to the report, "Abitol" not only contributed to gloss retention but exerted negligible effect on color retention. Other favorable properties imparted to interior gloss enamels by product are covered in the report.

ROTATIONAL VISCOMETER

Precision Scientific Co. 3737 W. Cortland St., Chicago 47, Ill., has published "Data Sheet 10911" on the Precision-Interchemical Rotational Viscometer, an instrument for determining the viscosity, yield value and thixotropic breakdown of highly viscous materials such as paints, varnishes, printing inks, greases and adhesives.

The illustrated sheet discusses applications and operation of the viscometer, together with its wide range, variable speed and other features.

ETHANOLAMINES

A 54-page technical data book describing ethanolamines is being offered by Allied Chemical & Dye Corporation, Nitrogen Division, Dept. EA, 40 Rector St., New York 6, N. Y.

This book fully describes monoethanolamine, diethanolamine, and triethanolamine listing their applications, chemical and physical properties, physiological properties, shipping specifications, handling and storage features, and a comprehensive bibliography.

Complete analytical procedures to determine specific gravity, weight, boiling range, color and odor are given. Graphic illustrations include data pertinent to viscosities, vapor pressure, densities, freezing curves and other characteristics.

GALVANIZED STEEL

A single-page bulletin describing its new galvanized steel conveyors has been issued by The Rapids-Standard Company Inc., Grand Rapids, Mich.

The literature gives full details on the new line of galvanized steel gravity conveyor channel which is being offered at the same price as painted steel channels.

Included is the story of the new galvanizing process developed by Inland Steel Co. to give, for the first time, galvanized steel which is claimed not to flake or chop under the most extreme tests.

PACKAGING

Publication of a revised edition of "How To Ship More Economically in Corrugated Boxes" has been announced by Hinde & Dauch, Sandusky, Ohio.

The 24-page Little Packaging Library booklet explores every phase of economy inherent in the use of corrugated packaging. Subjects treated include design of a corrugated box, testing, storage, shipping room layout, packing, sealing, stacking and loading. Ample illustrations show the proper techniques involved in each of the operations.

Four current case histories describe specific applications of corrugated boxes and indicate how careful box design and packaging room operations have effected significant savings for existing businesses.

PIGMENT SPECIFICATION

Tamms Industries, Inc., 228 N. LaSalle St., Chicago 1, Ill., has issued a Prime Paint Pigment Specification Data Brochure, related to paint manufacturing. It gives a comprehensive list of company raw material products. Supplements will be issued as new products are added.

1st. QUALITY

If Your Product Is Good

IT DESERVES PROTECTION

***with* VULCAN Containers**

Guard the high puality fo your qroduct with Vulcan Steel Containers. Vulcan Pails and Drums are high-quality steel. Hi-bake linings are available — guaranteed to protect your product from any physical or chemical change due to contact with its container.

You make your product good — Vulcan keeps it that way!

Vulcan Pails and Drums have been service-proven for paint, varnish and lacquer. All sizes (1 to 20 gallons). Wide selection of pouring nozzles and spouts. All styles (open head and closed head).

Expert lithographing. We reproduce your present trade mark or design a new one for you.

OVERNIGHT SERVICE. Sales offices and warehouses in principal cities.

Write or wire for detailed information and prices.

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PHOTOVOLT
Photoelectric GLOSSMETER

For reliable gloss measurements according to ASTM D523-53T on

Paints, Varnishes and Lacquers

Also for

- **Tristimulus Colorimetry with 3 Filters**
- **Sheen Measurements at 85 Degree Incidence**
- **Dry Hiding Power and Infra-Red Reflectance**

in accordance with Federal Specifications TT-P-141b

Portable, rugged, simple to operate

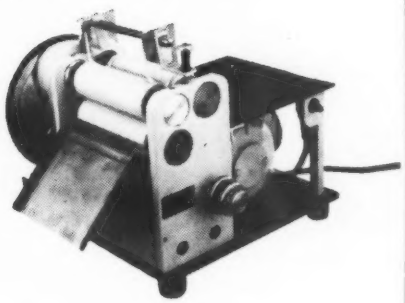
Write for Bulletin #677 to

PHOTOVOLT CORP.

95 Madison Avenue New York 16, N. Y.

NOW, A LOW COST
3-ROLLER
PAINT MILL

perfect for samplemixing and moderate production



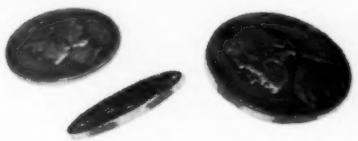
Here, at last, is a 3-roller paint mill that is ideal for test work, sample runs, and moderate production requirements. It is fully automatic, electrically operated, and features completely automatic adjustment of the parallel rollers. The stainless steel rollers are durable and easy to clean. There are four models to choose from for producing from 12 to 200 pounds an hour, each including its own stainless steel hopper. The same models are also available with hard porcelain rollers. Single roller mills also available.

Write for circular and full details

Pharmaceutical & Chemical Industry Supply Corp.

16 Hudson Street New York 13, N. Y.

IT'S NOT ONLY THE MONEY!



It's easy enough for you to save money in your lacquer formulations—if you're willing to use ingredients that sacrifice quality.

ZINFLEX, the modified shellac lacquer additive, is that rare exception—an ingredient that saves you money by enabling you to produce *superior* finishes!

ZINFLEX is modified for greater compatibility with hydrocarbon solvents. You can use *more* of it in your lacquers and at the same time gain the following advantages:

In Wood Lacquers
- *lighter, clearer, deeper finish*
- *better adhesion, elasticity, mar resistance*
- *high oil and naphtha resistance*
- *high solids content at working body*

In Metal Lacquers
- *greater adhesion to brass, aluminum, tin plate and steel*
- *better build*
- *improved flexibility*
- *greater hardness*
- *PLUS all the benefits Zinflex gives to wood lacquers*

Used successfully by leaders in the wood and metal lacquer field.

Made by the makers of BULLS EYE® Shellac.

Write on your letterhead for technical data, suggested formulations and a generous test sample of ZINFLEX.

WILLIAM ZINSSER & CO.

offices and factories at

516 West 59th Street New York 19, N. Y. 319 N. Western Ave. Chicago 12, Ill.

Advance Info

ZIRCO DRIER CATALYST 6%

NEW FAVORITE OF PAINT-MAKERS

Record-breaking sales indicate ZIRCO has become the new favorite of paint-makers.

The reasons behind this overwhelming acceptance are several, some are —

ZIRCO Replaces Cobalt — economical and non-staining
ZIRCO Replaces Lead — Works better and is believed non-toxic
Better through dry — tougher films
Flexible film
General film improvement

If you haven't yet tried ZIRCO, now is the time to get on the ZIRCO bandwagon and gain the benefits so many other paint-makers are enjoying. You get all the advantages listed above and many more. Write for a sample and complete data to

ADVANCE
SOLVENTS & CHEMICAL
DIV. OF CARLISLE CHEMICAL WORKS, INC.
245 Fifth Avenue • New York 16, N. Y.

ALCOHOL, SOLVENT CHARTS

Alcohol and solvent users can now obtain charts for gauging the contents of 55-gallon drums at various temperatures, by stick measurements. These supersede similar 54-gallon drum charts distributed in the past, since U.S.I. and other producers have now switched to the newer drum-size. Charts are available from U.S.I. local Sales Divisions, or from U. S. Industrial Chemicals Co., Division of National Distillers Products Corp., 99 Park Ave., New York 16, N. Y.

COMBATTING CORROSION

Papers of particular interest to paint men and others interested in combatting corrosion, presented at the Protective Coatings Division of The Chemical Institute of Canada at Toronto and Montreal last month, include:

T. L. Bird, assistant manager, Commercial Products Division, Canadian Marconi Co. Ltd., "Machines that 'Think', Their Effects on Business and Society"; J. V. Lang, The W. C. Hardesty Co., "Fatty Acids for Protective Coatings"; W. D. McMaster. Research Laboratories, General Motors, Detroit, "Recent Finishing Problems"; B. M. Baker, Canadian Industries Ltd., "Some Applications of Colorimetry"; R. P. A. Sims, Dept. of Agriculture, Ottawa, "Progress in Understanding of Vegetable Oil Polymerization"; and F. K. Daniel, Daniel Products Co., New York, "Influence of Solvents on Pigment Dispersion and 'Seeding'."

MOLYBDENUM

A series of technical data bulletins on several classes of molybdenum chemicals is being prepared by Battelle Memorial Institute, Columbus, Ohio, under commission from Climax Molybdenum Co. These bulletins will report the properties, methods of preparation and applications of theses compounds: organic complexes of molybdenum; molybdenum disulfide; heteropolymolybdates; cyanomolybdates; halides and oxyhalides of molybdenum.

The first of these bulletins will be ready for distribution within a few weeks, and the remainder will follow shortly.

Career Openings for CHEMISTS

Opportunities for ambitious young men with initiative, ability and imagination in expanding chemical program.

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FIRE PROTECTION

Catalog 73 covers the various generally accepted methods of fire detection, fire prevention, control and extinguishment associated with the field of special hazard fire protection. The highly illustrated catalog is available from "Automatic" Sprinkler Corporation of America, Youngstown, Ohio.

NUCLEAR CONFERENCE

Papers and abstracts of the Conference for Management on "The Place of the Atom in Your Business" which was sponsored by the Cleveland Engineering Society recently in conjunction with the Nuclear Congress, is now available in printed form.

Copies may be ordered from Cleveland Engineering Society, 2136 E. 19 St., Cleveland 15, Ohio, and are available in any quantity at $1.00 a copy postpaid.

WET GROUND MICA

Bulletin No. 22, published by the Wet Ground Mica Association, Inc., 420 Lexington Ave., New York 17, N. Y., is entitled "The Present Use of Wet Ground Mica as an Extender in Outdoor Latex Paints."

Seven tables deal with: 60/40 Styrene/Butadiene Emulsion Copolymer for Exterior Masonry Paints (Dow Latex 512-K); Dow Experimental Latex XX-2562 for Exterior Masonry Paints; Dow Experimental Latex X-2562, Experimental Exterior Paint (Formulation P-251-56-); Styrene Copolymer Resin in Latex Paints for Exterior Use on Stucco, Concrete, Masonry and Similar Surfaces; Celanese Polyvinyl Acetate Emulsions; Polyvinyl Acetate Emulsion "Elvacet" (E. I. Du Pont de Nemours & Co. Inc.); Polyvinyl Acetate Latex Paints for Exterior Use.

"CANNED" MOTOR PUMPS

A four-page bulletin, 1030, illustrates and describes new low cost "Series S Chempumps," latest addition to the company's line of sealless centrifugal pumps. Performance curves and dimension drawings are included along with a discussion of operating principles and a full list of specifications. Copies are available from Chempump Corp., Station K, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

METALLIC SOAPS

A new 30-page booklet on metallic soaps has been published by the Metasap Chemical Co., Dept. M, Harrison, N. J.

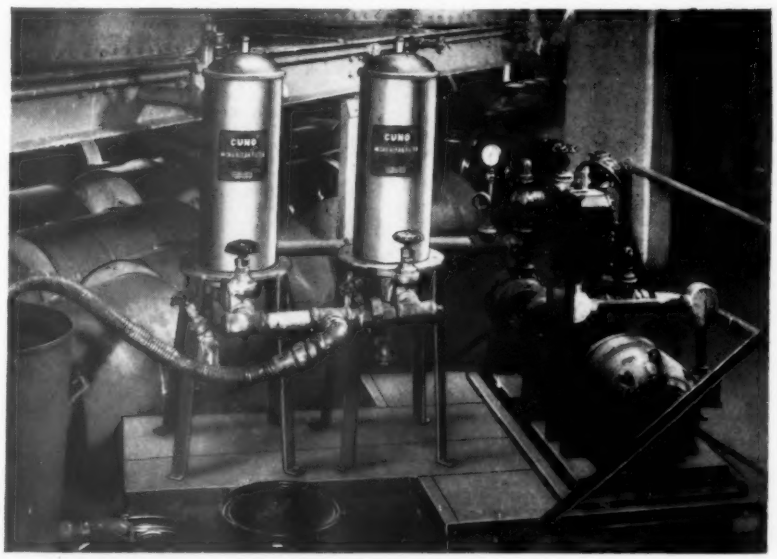
One of the features of the booklet is a complete history of metallic soaps, tracing their development from the 18th century to the present day, and describing in detail the role they play in today's industry.

The booklet also gives a complete descriptive listing of the company's metallic soaps, including physical and chemical characteristics and industrial applications.

SPRAY GUN, WIPER

A new brochure on an automatic rotary gun spray painting machine and an automatic rotary wiping machine is now available from Conforming Matrix Corp., 402 Factories Building, Toledo 2, Ohio.

It includes illustrations and complete description of the model RM 2G rotary gun, said to be particularly effective in the painting of round and deep-draw parts, and the DW24RT, designed for high production wiping of excess paint from stove, heater, and refrigerator knobs, etc. after mask-controlled spraying.



BETTER FINISHES, FASTER PRODUCTION. That's what this economical Cuno MICRO-KLEAN filter setup means to this leading enamel manufacturer.

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Abstracts from Cyanamid's Technical Data

MELAMINE RESIN 248-8

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Melamine Resin 248-8 is a butylated melamine-formaldehyde resin for baking applications. It combines these advantages:

Exceptionally fast cure
Superior chemical resistance
Excellent hardness and gloss
Durability
Economy

In alkyd-amino resin enamel formulations, Melamine Resin 248-8 is used in the proportion of 10% to 40% of vehicle solids. In durable automobile finishes, this resin offers fastest cure and greater hardness. Here the resin proportion is 10% to 30%. Its fast-curing characteristics also suggest its use in economical baking enamels. Melamine Resin 248-8 may be used with or without catalyst.

WRITE FOR complete technical data on Melamine Resin 248-8 and other Cyanamid resins. These data sheets are punched and ready for filing.

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PLASTICS AND RESINS DIVISION
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How HYDRITE Kaolinites affect HIDING POWER
in Semigloss Oleoresinous Enamels

HYDRITE Kaolinite particle size has an important effect on the hiding power of semigloss oleoresinous enamels. Curves at the right, obtained using different grades of HYDRITE Kaolinite in typical formulas, show that hiding power increases as finer particle size Kaolinites are used. It is especially significant that hiding power increased as PVC was increased, *in spite of the large reductions in titanium-calcium pigment* (See formulas below).

MATERIALS	Pounds per 100 gallons at 45% PVC	50% PVC	55% PVC
Titanium calcium pigment	550	475	400
Kaolinite	140	215	290
Litharge	1.4	1.4	1.4
Aluminum stearate (high acid)	3.5	3.5	3.5
Bodied Castor and Linseed oils (71%)	298	250	210
Ester Gum (60%—in mineral spirits)	98	32	70
Kerosene	23	23	23
Mineral Spirits (155-200°C.)	140	180	220
Cobalt naphthenate dryer (6%)	2.4	2	1.7
	1256	1232	1220

This data shows conclusively that HYDRITE Kaolinites can have substantial effect on the hiding power of oleoresinous enamels. When their effect on gloss is also considered, (See #8 in this series) it becomes apparent that they afford several approaches to the formulation of semigloss or eggshell enamels having excellent properties at reduced cost.

Technical Service Bulletin TSBH-13 is now available.

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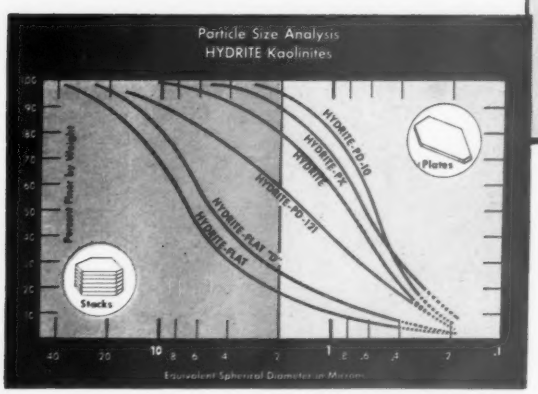
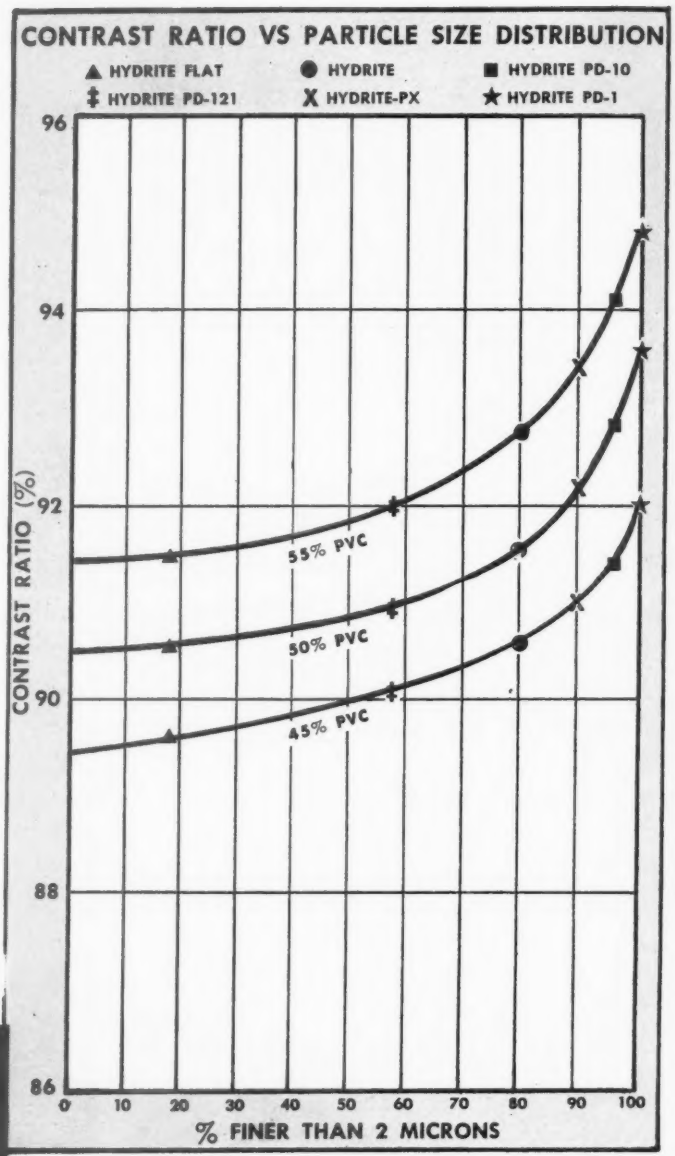


#9 in a series describing the effect of Kaolinite particle size on important properties of various paint systems.



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